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Teacher perceptions of agricultural teaching practices and methods for youth and adults in Iowa

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Teacher perceptions of agricultural teaching practices and methods for youth and adults in Iowa

by

Abdul Karim Kassem

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CHAPTER I. INTRODUCTION

Method of teaching is recognized as a process used in any setting to transfer knowledge and facilitate information to the learners in order to enhance the learners' understanding of the subject matter in an appropriate way. It is a process in which instructors can transfer or facilitate information, knowledge and skills through specific teaching methods. From notes taken during the course, "Foundation of Adult Education," there are many different philosophical thoughts about the teacher. Some philosophers view the teacher as a "manager" or "coordinator." It is the opinion of the writer that the teacher in some subject areas could be a "facilitator;" whereas in other subject areas the teacher could be a "manager" or "organizer." Teachers will be different from one teaching area to another depending upon the subject matter being taught, the learning environment, and the teaching methods used.

> There are two types of learning in agricultural education. These types are: formal education which takes place in the school (indoor education), and informal education which takes place out of school (outdoor education). Many elements often equated with informal education include open-space or wall-less classrooms, carpet, multi-age grouping, or special arrangements of the furniture. These things may well enhance the learning situation, but they are only subsidiary to central matters (King, 1974, p. 10).

Teaching, defined as a method, is used to facilitate learners in understanding and use of new information or ideas to improve their life conditions. "Teaching is the opportunity to help others to live their lives fully. It is the meaning which we help to give to our learners' lives through their physical, emotional, intellectual and social growth" (Carkhuff, 1981, p. 1). Carkhuff suggested that teachers can help learners and involve them in learning through teaching ability, teacher knowledge, organization of the contents of learning, teaching methods, learning experiences, and participation in learning.

> There are as many different kinds of teaching as there are teachers. Some teachers emphasize the use of question and answer techniques, others use

> a lot of programmed instruction. Still others utilize the overhead projector a great deal. In a very real sense, each teacher is a different teaching method. Indeed, each teacher feels whole when he or she is delivering the content using teaching methods. Probably more than anything else, the teacher's method reflects the uniqueness of the teacher (Carkhuff, 1981, p. 90).

Melvin (1944) indicated that a teacher is a helper who can influence the student's knowledge or ideas according to the teacher's strength in the subject matter.

> Every teacher who helps human beings, helps them according to his own strength. The teacher is not merely a master of incidental knowledge that can be picked up for a pittance of hours in a closet with a book. He is not merely the trickster who knows a few techniques. On the contrary, his every glance is a carrier of value, his touch, his word, his judgment make teaching thin and mean of rich and meaningful (Melvin, 1944, p. 22).

Carkhuff (1981) suggested that teaching effectiveness depends on the manner of handling subject matter, use of teaching methods, and controlling and leading students. He further suggested that the use of teaching method in agriculture depends on class size, time, available resources, students participation, type of students, teacher's knowledge and skills, teacher-student relationships, teacher interest in teaching, student interest in learning, teacher motivation, and teacher preparation.

Motivation of learners can be achieved through wise choice of teaching method. A wise choice of teaching method can do the following.

1) Create a positive attitude toward learning:

> Students can identify the motivating and non-motivating qualities of their teachers. Motivating qualities are intelligence, knowledge of subject matter, attitude, atmosphere, enthusiasm, inspiration, resourcefulness, concern, approachability, method techniques, and justice (Hong, 1989, p. 15).

2) Develop interest in subject matter and materials:

> Teaching methods may be used to motivate, introduce a particular segment of material, deliver the main substance of it, or else to confirm and evaluate its acquisition. Sometimes, for greater effect, it may be rational to employ several techniques simultaneously. For example, showing the pupil a natural object and accompanying it with a running commentary on its dimension, color and other details (Zverev, 1983, p. 27).

3) Assist in the process of learning:

> There are two major theories about the use of effort-producing stimuli in the teaching process. The first is that the student will learn more effectively if the teacher and/or society through the use of aversive techniques openly or overtly tries to induce the student to make an effort to learn. The second theory is that the student will learn more effectively if he believes that he is free to decide what and when he should learn (Laska, 1973, p. 2-3).

Zverev (1983, p. 54) indicated that the method of stimulation generally associated with human emotions presupposes the use of such techniques as:

a) creating interest-generating situations;

b) citing examples from art and literature;

c) creating situations of novelty and immediacy;

d) playing cognitive games;

e) organizing a debate on a specific topic;

f) analyzing real-life situations;

g) creating the right atmosphere for success; and

h) emphasizing the social and personal assets of learning achievement.

> To be sure, there is a variety principle that characterizes effective teaching methods: the more methods the teacher employs the more effective is the teaching, the more different ways the teacher involves the learner, the more learning takes place (Carkhuff, 1981, p. 90).

Spitze (1970) cited the following principles in choosing appropriate teaching method.

a) Involving students in choosing techniques.

b) Using a real life situation.

c) Encouraging students to participate in learning activities.

d) Motivating students by using an appropriate method of teaching.

There are many changes occurring in agricultural education. These changes are related to technology transfer, production development, curriculum improvement, and

new developments in methods of teaching. The use of teaching method has become very important in solving most problems which could be encountered in agriculture. Because agricultural education deals with different people in different societies, using agricultural teaching methods in a very effective way would be one of the most important elements to increase the enrollment of students in high school agriculture. The investigator believes that through effective agriculture teaching methods, diffusing knowledge to the learners can improve their life conditions. In his opinion, method of teaching agriculture in high schools is to assist students' performance in the subject matter.

> For this reason, the role of teachers and teaching is very important. Instructional methods have to improve in order to get the most from the present knowledge explosion. In order to improve the quality of instruction and assist students in learning, a variety of methods need to be utilized. Some are traditional, others modern and others till in their experimental stages. In addition to variety of methods, a number of teaching tools/aids are also being used. Although a variety of methods and tools are being used, efforts are being made to improve instructional quality" (Robert, 1988, p. 1).

The need for the agriculture teacher to use effective methods of teaching in agriculture is most important for the following reasons: Effective methods:

- motivate learners;
- help learners increase their knowledge and develop their skills;
- assist in achieving learning tasks;
- provide guidance to learners;
- increase participation in high school agriculture;
- make the learning activities available under different environmental conditions;
- increase the experience in agricultural learning;
- improve learner abilities;
- improve learner life conditions; and
- increase the relationship between learners and instructors.

The purpose of this study was to identify effective agricultural teaching methods used for adults and youth in Iowa. The primary objectives of this study were to assess:

a. The importance of selected instructional techniques.

b. Teachers beliefs about their role in teaching.

c. Perceptions of the effectiveness of selected instructional methods in formal educational settings of youth and adults.

d. Perceptions of the effectiveness of selected instructional methods in informal educational settings of youth and adults.

CHAPTER II. REVIEW OF LITERATURE

General method

Weston and Cranton (1986) stated that method is a kind of communication happening between teachers and learners. "Teaching method can be defined as the vehicle or technique for instructor-student communication and can be described in at least four categories: 1) instructor-centered, 2) interactive, 3) individualized, and 4) experiential" (Weston and Cranton, 1986, p. 260). In the first category (instructor-centered), they indicated that the interaction between teachers and students is "one-way." The most important of this category is lecture in which the teacher can influence his audience by using his direct speech. The second category (interactive methods) is the interaction between learners and among teachers and learners. Group discussion is the most important method used in this category. The third category (individualized) is where the learner can interact at different levels or stages of the learning process. The most important method used in this category is computer use. Weston and Cranton (1986, p. 263) indicated that:

> Experiential methods can be described in terms of each of the categories discussed so far: that is, they may be instructor-centered, interactive, and individualized. It is the unique characteristic of the student performing in a real or simulated setting which distinguishes the experiential methods from the previous categories.

Verner (1962, p. 26) stated, "The way in which method suited to one cultural group may not be appropriate for another. Charters (1912) indicated that developing method depends on many factors. One of these factors is the teacher's ability and knowledge, and student participation.

> Methods of good teaching depend upon meeting pupil needs or the usefulness of the knowledge in the learner's life activities; the interest of the learner in his lesson, the thinking and understanding that result from the discussion of the lesson, the repetition; if it is necessary, what is provided to fix the useful knowledge in mind (Stewart, 1950, p. 6).

Charters (1912, p. 270) defined developing method as, "the emphasis placed upon the pupil and the textbook where teachers are listed as instruments in the proper functioning of his activity. In terms of control, the developing method may be described as a method by which the pupil works out his own methods and control with such assistance from teacher and text as is economical of time and effort."

Zverev (1983, p. 22) stated that "teaching method is used with teaching goals in a direct way or through the contents of agricultural education. There is close interaction between teaching methods and techniques. Only the obvious are the advantages of illustrating the teacher's purely verbal discourse by such auxiliaries as maps, slides, films and natural objects, as well as experimental demonstrations. Teaching methods and techniques are employed for one and the same purpose."

> In most general terms, a teaching method implies choices as to the objectives of teaching, what materials are to be taught, how they are graded and sequenced and how they are presented (Dillon, 1986, p. 114).

> The reason there are different methods of teaching is that there are different basic assumptions or theories about what is the most effective way to motivate students and different assumptions about the most effective way to bring about a particular learning outcome (Laska, 1973, p. 2).

Verner (1962, p. 9) gave his opinion about the difference between method and technique. He defined method by saying:

> The relationship established by the institutional agent with a potential body of participants for the purpose of systematically diffusing knowledge among a prescribed, but not necessarily identified public.

Verner defined technique as:

> The relationship established by the institutional agent to facilitate learning among a particular and precisely defined body of participants in a specific situation.

> Technique and method shade into each other, for both are, in a wide sense method. But technique is independent of content of learning; method is partly determined by particular content, such as literature or mathematics. ... Technique of teaching cover that area of procedure which is concerned with situations which recur again and again in the process of teaching.

> Method is concerned not merely with general situation, but with particular ones and so is concerned with what is being learned (Melvin, 1944, p. 20).

Zverev (1983) indicated that there are three levels of teaching method development. These three levels are:

1) develop a knowledge system;

2) give reasons for using method; and

3) develop and improve the quality of learning.

When developing cognitive knowledge, Zverev (1983) gave a list of activities:

1) using an adequate knowledge;

2) making a comparison for knowledge activities;

3) applying learning activities;

4) analyzing learning activities;

5) synthesizing learning activities; and

6) evaluating learning activities.

Zverev (1983:33) illustrated in which area the method of teaching will take place in the concept of education, as seen in Figure 1.

> There is agreement that the teaching methods used should reflect the known mechanisms of conceptual change. There is considerable agreement that optimal teaching method is partly a function of the type of knowledge being acquired. The point I am illustrating with respect to teaching methods and type of knowledge is simply that different instructional approaches may be appropriate for different type of knowledge of knowledge (Dillon, 1986, pp. 8-9).

Weston and Cranton (1986) indicated that material is recognized as a resource for teaching methods. "Materials used to communicate an instructional message have three components in common: 1) a delivery system, 2) message, and 3) condition of abstractedness" (Weston and Cranton, 1986, p. 266).

> The effectiveness of an individual's teaching does not necessarily correlate with readiness to attend staff meetings, go on courses, build elaborate teaching aids or be surrounded by exercise books from corn flakes to cocoa time. The fact that different teachers spend vastly differing amounts

of time on such activities as those described serves to underline the fact that they are voluntary in extent if not nature and that no one is obliged to take them very seriously (Dawson, 1984, pp. 14-15).

Carkhuff (1981) gave some principles of effective use of methods. These principles are:

1) applying variety of methods,

2) utilizing variety of effective methods,

3) demonstrating methods,

4) emphasizing learning experiences.

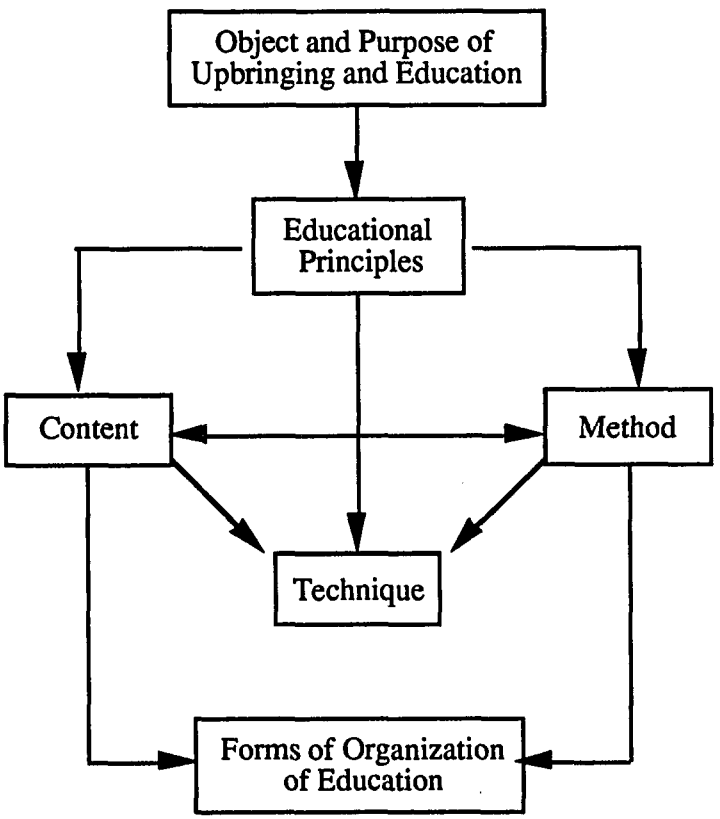

Figure 1. The conception of education

> There have been devised, from time to time a great variety of ways in which the exigencies of teaching may be met. The teacher should be alert to discern the method that furnishes the largest measure of control over the learning process consistent with the economical expenditure of energy, and also to utilize special ways of stimulating the learner to improve in specific directions. Among the methods of teaching that may be used the following are more or less familiar: lecture, recitation, laboratory, question and answer, demonstration, illustration, supervised study, field trip, practicum, survey, examination, socialized recitation, project, discussion, shop (Stewart, 1930, p. 193).

Cargin (1983) indicated that other methods could be used in agriculture for adults and youth in formal and informal educational settings. These methods were: "problem-solving," "conferences," "self-study," "group discussion," "TV or video cassettes," "radio, records or audio cassettes."

> The five teaching strategies used most frequently within seven content areas of home economics, by both groups of teachers were: lectures, laboratory, demonstration, group discussion, and case studies (Cargin, 1983, p. 31).

Specific method

Supervised study is a type of method used to assist learners in increasing their knowledge about the subject matter. Spitze (1970) indicated that supervised study is recognized as a method in which the instructors can assign a reading for the student according to study guides. Spitze (1970) said that it is a type of method which has some problems. These problems include:

1) Students reading the same book when the students are not in the same level of reading.

2) Reading assignments are given to a class without any interest from the students.

3) Study guides are developed without taking care for previous learner experience.

> Supervised study can be a useful technique when the study consists of individual and group projects of genuine interest to the student. It then means that the teacher circulates among the students to inspire, advise,

> encourage, and offer reference materials and guidance (Spitze, 1970, p. 33).

> The teacher's task in organizing assignments at three or four levels of difficulty and still providing a core of common activities in which the whole class participates is both time consuming and difficult. It requires thorough familiarity with the characteristics of the students and also with the materials (Hastings, 1963, p. 25).

Hastings (1963, p. 26) mentioned the advantages and disadvantages for the supervised study methods. These advantages and disadvantages are listed below.

Advantages:

1) Meets varying needs and interests of students.

2) Helps pupils acquire individual skills and work methods.

Disadvantages:

1) Loses its value unless well planned.

2) Some teachers do not really supervise or direct the study.

Spitze (1970) said that tests, quizzes, evaluations, and examinations are kinds of teaching method. He said the main purpose of this method is to improve students' understanding of the information studied.

> Examinations are infrequent outside of school, but since they are sometimes required to secure a job or obtain promotions, test-taking skills may be useful to a limited extent. Some kinds also require writing skill and therefore may encourage its development (Spitze, 1970, pp. 32-33).

> Before the test begins, specify how the students should ask questions, if they have any. Do you want them to raise their hands and direct their questions to you at once? Or, do you want to go to the student to answer a question? Usually it is better if the students do not ask questions so the whole class can hear, because it disrupts others. Also, tell students in advance what to do when they finish the test. Should they bring it to you? Then should they study another subject, read a library book, or just relax? (Henson, 1988, p. 342).

Discussion is a technique used to include variety and purpose in the learning process. There are many types of discussion. These types were listed by Spitze (1970, p. 26):

- whole group--limited groups on large;
- buzz groups--small groups of 2 to 8 into which a large group is divided;
- panel--small group (usually 3 to 6) who discuss a given subject seated in semi-circle in front of large group;
- symposium--a series of short speeches (5 to 20 minutes) on various aspects of a subject, followed by questions from the listening group;
- forum--usually two speakers presenting different views on the same subject, followed by questions from the listening group;
- colloquium--variously defined, but may be one or more resource persons who respond to questions from the group rather than presenting addresses; and
- informal debate--group divided into two teams of somewhat equal size to discuss a debatable subject without many of the rules of formal debate.

Morgan et al. (1967, p. 76) indicated that discussions may be used to:

1) stimulate people to become aware of mutual problems,
2) help them in identifying the problems,
3) aid them in exploring these problems,
4) assist them in finding solutions to problems, and
5) provide an opportunity for them to plan programs of action.

Panel discussion is a method of teaching used in high school agricultural education programs.

> It is a technique for arousing spontaneous reaction from both the discussion group and the audience. The selected group is brought around the table at an assigned time and problems are discussed under the leadership of chairman. The chairman is merely a temporizer of the situation, an authority for the granting of the floor. He may enter the argument or maintain an unbiased view by controlling equality of expression. Members of the panel need not be experts for they are there to state their view, learn the thinking of others and find an approximation of truth (Sands, 1949, p. 126).
>
> The panel leader has the major responsibilities of keeping the panel moving toward the class objective, given equal opportunities to all panel members, not allowing long speeches, and encouraging questions and participation by the rest of the class. He should finally summarize the points discussed and the tentative conclusion reached (Roderick, 1984, pp. 8-9).

> The most important member of a panel is the leader. It is his responsibility to direct activities and assist any member who is experiencing difficulty (Hoover, 1972, p. 222).

Hastings (1963) mentioned some advantages and disadvantages for panel discussion method. These advantages and disadvantages are listed below:

Advantages:

- make the total student participate in discussion,
- create interest for discussion,
- create group thinking,
- sharing ideas, and
- make the materials and the subject very clear by participating in group discussion.

Disadvantages:

- encourage students to ask questions and make argument discussion and
- give students to deviance their idea in discussion group.

Hastings (1963) pointed out that demonstration is a method used in agriculture and other areas of study. He claimed it is used to provide information and develop knowledge of the learner. Morgan et al. (1972, p. 125) indicated that there are two types of demonstration. These two types are: method demonstration which is concerned with "showing what is done, how it is done, and explaining each step as it is taken;" and result demonstration which is concerned with "showing learners the result by giving an example which include some source of evidence that will require the learner to watch and think." Leonard et al. (1972) indicated that demonstration is a method of teaching used to involve learners to participate in the learning experience by practicing, showing and applying. They gave the following ideas about why the demonstration is used as a method of teaching:

- involving students;

- stimulating students,
- identifying the problem,
- providing information,
- creating observation,
- using materials,
- gathering information,
- applying information,
- analyzing information, and
- reviewing ideas.

Hastings (1963) stated the following rules when using demonstrations:

- Keep the demonstration very simple.
- Set the place for the demonstration.
- Provide enough information.
- Limit time for demonstration.
- Encourage students to ask questions.
- Give a summary for the purpose of doing the demonstration.
- Give the chance for the students to understand the demonstration by asking them some questions.
- Provide writen handout materials.
- Make students practice demonstration.

Hoover (1972, p. 384) indicated that demonstrations are used in many ways. They are used as:

1) Motivation device,
2) Technique for extending work out-of-class,
3) Means of clarifying points during a lesson,
4) Device for adding emphasis, and

5) Tool for skill development.

> When presenting a demonstration certain important factors should be kept in mind: (1) the demonstration should be well planned so that all important points are firmly fixed in the teacher's mind; (2) the demonstration should be organized so that all students are able to see and hear well (Bucher and Koenig, 1978, p. 272).

Leonard et al. (1972) presented some ideas about how to prepare for using a demonstration:

1) Make a list of all the equipment and materials which can be used by students;

2) Equipment and materials should be checked out before using them;

3) Choose a place for using materials and equipment;

4) Give an approximate time for using materials and equipment;

5) Make the place of working as safe as you can;

6) Make the demonstration methods as a learning process;

7) Let the learner see the process of demonstration step by step;

8) Manage your time by giving a time for introduction, discussion and analysis, and the chance for students to take notes;

9) Give the students a chance to understand more about the subject matter in the lesson or in any other activities by repetition or doing more practices.

Bucher and Koenig (1978) presented some advantages and disadvantages of demonstrations as a teaching method. These advantages and disadvantages are presented below:

Advantages:

- It provides input to stimulate students as any other audiovisual method;
- It provides activities that students can gain a learning experience;
- It develops a self-concept; and
- It provides a strong motivation.

Disadvantages:

- Sometimes it is difficult to be organized;

- It needs good preparation and presentation; and
- It gives a bad reflection when it is not done well.

Hastings (1963) indicated that the field trip is a plan for visiting. It could be visiting a farm, people, and new projects. It is outside the regular classroom. It is used for formal and informal education and is very commonly used in agricultural teaching methods. Hastings (1963, p. 22) wrote that a field trip can be used:

- to develop appreciation and understanding of things as they really are and to secure information at its source;
- to help bring school and community programs into a closer relationship;
- to bring a new lesson or unit or to culminate one.

Weaver and Cenci (1960) indicated that the field trip has two forms of impact on educational theory.

> First is "motivation," in which field trips can stimulate the student's interests about the subject matter. In this case students can observe, develop their knowledge, recognize ideas and develop their understanding about the subject matter. Second is "learning the occupation," in which the student can have the opportunity to realize and get a clear relationship between what they learned in class and what they observed out of class and develop a better understanding about the subject matter.

Newcomb et al. (1986) stated the conducting field trip should go through the following items:

1) reserve transportation,
2) be well planned,
3) inform the people to be at the location on time,
4) control students' behavior,
5) state the purpose of the field trip clearly,
6) let students make notes,
7) make sure that the information will be part of the students' studies, and
8) let students present a report in class.

Hastings (1963, p. 22) wrote that "a field trip consists of three parts: a discussion period for planning the trip, the trip itself, and a second discussion period to summarize and evaluate what was seen and learned." Hastings also maintained that "in the field trip the teacher should raise some questions in order to make the students recognize their observation carefully. Teachers should summarize, compare, and relate every part of students' observations to each other."

> Students and teachers might well evaluate the experience. Did it serve our purpose? What factors did we like most? If we were to take the trip again, what suggestions would we have for improvement? It is evident that field trips can be effectively planned and executed. For best results they require careful and cooperative planning. Perhaps most important of all, they may show that classroom learning is closely related to the everyday activities of people (Hoover, 1972, pp. 391-392).

Hastings (1963) explained that interviewing is the method used by teachers to make the students learn new information from outside the classroom. He also stated that it is a method used to make the students understand how other people think, react, and apply their learning experience in their life situation.

Hastings (1963, p. 24) suggested the following points to use in interviewing.

- Conduct interviews singly or in groups of not more than three students to avoid confusion.
- Emphasize the importance of neatness to avoid the unfavorable impression that careless dress and a sloppy appearance may give.
- Have a student get their interview off to a good start with a friendly greeting.
- Caution students against arguing.
- Prepare students to terminate their visit if the person being interviewed becomes inattentive or seems reluctant to carry the conversation further, even though they might not have obtained all the information they desire.
- Essential points listed in the summary can be reported to the class for general use.

Sands (1949) said that lectures are a method used when the class is of thirty students or more. It is a suitable teaching method when the instructor needs to provide

information to a specific group of people. "A lecture is a one-man show. If the lecturer has capacity, the lecture can be unexcelled in its comprehensive presentation of material" (Sands, 1949, p. 123). She continues her thought by saying that "it is thought that few teachers are strong lecturers and that the method should be used with caution. If a teacher feels that she can teach better by lecturing, she should lecture unless a supervisor presents incontrovertible evidence that her lectures fail in meeting their goals."

> The lecture is a quick way to present material because by using notes the lecturer may move from one thought to the next in logical fashion. ...It can be made more effective by use of visual aids, printed material which might be put into the hands of each audience participant or an outline of the address made available ahead of time (Morgan et al., 1963, p. 68).

"Despite the shortcomings of the lecture as a teaching method, it has value in secondary education, limited though it may be" (Weaver and Cenci, 1960, p. 85). They also indicated that most important for using this method is to:

- develop a general interest in the subject matter,
- give a guidance to students, and
- provide information.

"It is mainly an information process and used most effectively under the following conditions:

- to present new information,
- to motivate and stimulate interest,
- to summarize and give high points, and
- to present information to large groups" (Roderick, 1984, p. 7).

Hensen (1988) indicated using lectures as a method of teaching by presenting can:

- present or introduce a lesson to students,
- demonstrate the subject matter,
- summarize the most important point in the subject matter,
- interpret the information.

"Traditionally, mathematics courses have been taught by the lecture discussion method. Although teachers using this method have done an adequate job of teaching mathematics to many students, it is not ideally suited to teaching mathematics to the individual" (Farrell, 1980, p. 3). Farrell (1980) indicated that lecture is not a good method of teaching for the following reasons:

1) lack of control,
2) difficulty of getting feedback from students,
3) an appropriate method for slower students,
4) lack of making group discussion,
5) lack of doing assignment,
6) test the only way for evaluating students,
7) lack of interaction between students and teacher,
8) get a little attention from students, and
9) lack of using material.

"For the beginning teachers, lectures were the most commonly used teaching strategy in five of the seven subject areas: child development, consumer education, family living, family finance, and housing" (Cargin, 1983, p. 29).

Hansen (1988) indicated some points that could be improved using the lecture as a method of teaching. These points were:

- Introduce the objective before starting the lecture;
- The speed of the lecturer should be normal;
- Give some real example to get students' attention;
- The lecture should be well organized;
- Give a summary after each 15 minutes of each speech;
- Use simple language; and
- Include some available materials.

Cargin (1983) stated that the laboratory is an important tool to solve a problem in an effective way of teaching. It is used to find solutions to problems. "Laboratory teaching assumes that first-hand experience in observation and manipulation of the materials of science is superior to other methods of developing understanding and appreciation" (McKeachie, 1963, p. 1144).

> An interesting expansion in the concept of a laboratory has taken place during the past decade and it is not unusual for references to be made to a social science laboratory, a fine arts laboratory, or a curriculum laboratory. It is here to stay by whatever name it is called or whether the work is done in a specialized laboratory, a workroom, a class demonstration, or in a library. The important thing is that research activity takes place which utilizes the scientific method and develops an appreciation for it (Sands, 1949, pp. 129-130).

Leonard et al. (1972, pp. 208-209) indicated the functions of the laboratory. These functions were:

1) Learning a technique. You may and should demonstrate a particular technique in order to introduce it to you.

2) Practicing a skill. This type of lab experience furnishes the student with the time and place to practice some skill that he has acquired in order to develop facility in its use, and is the modern counterpart of the old adage, practice makes perfect.

3) Illustrating a principle. This laboratory experience adds visual and material substance to a variable description and students can apply what they learned to real problems.

4) Gathering data and gaining experience in its interpretation.

5) Learning to use equipment. Many lab or workshop experiences are specifically tailored to instruct students in the operation and use of equipment that they will be using themselves later in their work that term or at some later date in a job situation.

McKeachie (1963) stated that students developed more understanding and progressed more in learning activities by using the laboratory method than by using other methods such as lecture and demonstration. "Whether or not laboratory is superior to lecture-demonstration in developing understanding and problem-solving skills probably depends upon the extent to which understanding of concepts and general problem-solving

procedures are emphasized by the instructor in the laboratory situation" (McKeachie, 1963, p. 1145.

> Students must practice what they have learned in the classroom until they are truly skilled workers. Yet laboratory is more than applying what has been learned in the classroom. It is a place where additional instruction is given, competence is developed under the watchful eye of masterful teachers, and improved work attitudes are developed (Newcomb, 1986, p. 220).

> The laboratory method has the advantage of giving the student actual experience and of appealing to a variety of senses. Its greatest disadvantage is that it requires more time than most other methods (Knowles and Overstreet, 1951, pp. 45-46).

Schaffer (1973) indicated that the project is the most important method of teaching used in high school agriculture to increase learners' knowledge about the subject matter. Schaffer (1973, p. 313) pointed out that "at one time the project method was held as the best means of individualized instruction. Today the class or group project is being used more and more." Schaffer (1973) found that projects gave students better understanding through:

1) working as a group,
2) gathering in real situations,
3) organizing group projects,
4) involvement,
5) making the subject interesting to the students.

Henson (1988, p. 279) recommended that, "the teacher provide a list of topics that will be helpful in suggesting ideas and boundaries for projects. He also suggested, however, that students need to be free to choose their particular project. Many teachers view projects as an opportunity to provide successful experience for everyone."

"Independent study programs frequently involve the execution of projects in which a student or group of students undertakes to gather and integrate data relative to some problem" (McKeachie, 1963, p. 1145). McKeachie also stated, "Presumably the

real superiority of the project method should be revealed in measures of motivation and resourcefulness. But neither conventional nor project class made significant gains from the beginning to the end of the semester."

Knowles and Overstreet (1951, p. 45) pointed out that "the project method stimulates interest and gives the students an opportunity to pursue their special interests. Projects also enable students to obtain practical experience and to gain a sense of accomplishment."

Sands (1949, p. 130) indicated that "problems exist in every field of the curriculum and in almost countless numbers. Intelligent teaching leads students gradually, continuously, and successfully into successively more difficult areas in which the problems are more complex."

Phipps (1980, p. 322) pointed out, "The instructor may help a student in solving problems in agriculture by:

1) Having the student state the problem in the form of a question and in a clear and concise manner. (The problem should grow out of the occupational experiences of the student, be of interest to the student, and call for superior thinking.)

2) Developing with the student, or students in case of class instruction, a number of questions or factors which will need to be considered in reaching a satisfactory solution to the problem.

3) Assisting the student in selecting suitable references or other teaching aids.

4) Conducting a supervised study period in which the students review and evaluate information. Problem-solving under this method becomes a procedure of seeking the best answers to the questions and factors pertaining to the problem, weighing the information, drawing inferences, and making decisions needed in the solution of the problem."

The problem-solving method of teaching promotes student inquiry and exploration to find new solutions to problems that have no predetermined answer. It is the responsibility of the teacher to design tasks that will require these cognitive processes and force the student to discover from several possible solutions that which is most appropriate (Bucher and Koenig, 1978, p. 276).

Bucher and Koenig (1978) presented advantages and disadvantages in using problems in teaching methods. These advantages and disadvantages are listed below.

Advantages:

1) A problem can provide a good opportunity for increasing learning experience.
2) A problem gives chance for student to discover an appropriate solution.
3) Through a problem, the teacher is able to assist students in their learning activities.

Disadvantages:

1) It takes time to discover a solution.
2) Understanding on the part of students, to use the problem to study the content of the class.

"Audio-visual aids are devices which permit a more effective use of a multi-sensory approach to learning than just words can provide. Many different types of materials are included under this heading: projectors, charts, models, chalkboards, recording machines, maps, radio and television" (Leonard et al., 1972, p. 94). In this study video cassettes, and the recorder were considered separate teaching methods used in high school agricultural education.

Morgan et al. (1960, pp. 135-136) indicated that, "a great deal of research has been done on the value of audio-visual aids. The results of this research prove conclusively that they are a decided help in learning when they are chosen wisely, and used properly. These are some of the ways the audio-visual aid may be of value in learning:

1) they help to give correct first concepts or impressions,
2) they stimulate interest,
3) they promote better understanding,
4) they supplement other sources of learning,
5) they add variety to teaching methods,

6) they made for economy of time,

7) they promote intellectual curiosity,

8) they tend to reduce verbalism or the repetition of words without knowing their meanings,

9) they contribute to longer retention of learning, and

10) they can give new concepts of things outside of the range of ordinary experience."

Hansen (1971) found that the videotape was an effective method used in agriculture. He said effective use of this method depends upon the teacher who operates and conducts this method in an appropriate time for students according to their interests and needs.

> With a variety of visual aids from which to choose, teachers should use the appropriate one to satisfy the need or, if necessary, to develop supplementary aids. Various teaching aids create interest, stimulate more effective learning by the student as well as heighten respect for the professional capabilities of the teacher" (Weaver and Cenci, 1960, p. 128).

Petersen (1970) found that using audio-visual methods was a very effective tool. Petersen (1970, p. 81) gave his opinion about the effectiveness of using audio-visual methods by saying "this technique could:

1) be effectively used for individualized instruction,

2) increase students motivation, and

3) reduce the time required to teach students."

Butcher and Koenig (1978) stated some advantages and disadvantages in using audio-visual techniques as a method in teaching. These advantages and disadvantages are listed below:

Advantages:

1) It gives the students a better understanding for the subject matter.

2) It makes the teacher present the subject matter in different ways.

3) It increases the motivation of learners.

4) It increases the learning experiences.

Disadvantages:

1) It is very expensive.

2) Some sources of materials probably become outdated.

3) There is no interaction between students and teachers.

Study recitation is a method of teaching that givs an assignment to students and asks an oral question to see if the students gained any new information from that particular learning assignment.

> The study recitation method is a convenient technique for giving assignments to large numbers of students. The teacher with classes ranging from twenty-five to sixty students must have a method which will provide all students with an adequate background in the subject. The lesson assignment and study period are designed to give that common background. The recitation period is utilized as a time for investigating areas in which the students obtain fuller understandings of the subject. The teacher can make explanations and interpretations; she can uncover the strong and weak areas in student learning. The recitation period can be a time for the stimulation of student interest through discussion and exchange of viewpoints (Sands, 1949, p. 124).

> It requires little effort and preparation on the part of the teacher, but for teaching effectiveness, its disadvantage are legion (Spitze, 1970, p. 30).

"A conference is a meeting of people in large or small groups" (Morgan et al., 1963, p. 60).

> Conferences with lawyers, physicians, clergymen, and other professional persons, as well as with relatives and friends, are a definite part of living and students need to learn how to utilize such conferences to gain knowledge and support. Experience in conferences with teachers, or with others whom teachers suggest or help to arrange, may provide the necessary guidance (Spitze, 1970, p. 14-15).

> If the student responds negatively, ignoring the student is appropriate, but if the disruption continues the students should be asked to leave the room and wait outside until the end of the period, when you are free to arrange for a private talk. Private conferences can be effective if they place part of the responsibility for correcting the student's behavior on both the teacher and the student and if the teacher looks for the cause of the misbehavior (Henson, 1988, p. 306).

Question and answer is a method used to encourage students to participate in learning activities in order to increase their knowledge and skills. Hastings (1963) said that question and answer is a method used when there is a lack of participation in class discussions. Hastings (1963) suggested points about how to use question and answer technique in teaching. They were as follows.

- Give a question to students for discussion.
- Answer the questions which are presented by the students.
- Make the students answer questions from the other groups.

Leonard et al. (1972, pp. 72-74) presented the following twelve suggestions about how instructors can present questions and answers in an effective way.

1) Ask the question first, and then select the person to answer it.
2) If you ask a question requiring some thought, then provide the time for students to formulate and phrase an adequate response.
3) If several partial answers are given, a student might be asked to summarize these responses.
4) Try to involve as many of your students in a lesson as possible.
5) Bring non volunteers into the lesson by learning about their hobbies, interests, school activities, and athletic interests.
6) Do not discourage volunteering.
7) A student who gives a good answer should be complimented.
8) Maintain a balance between calling on volunteers and on non volunteers.
9) There should be no predictable system for calling on students.
10) Avoid repeating answers or questions.
11) Students should always be expected to evaluate the responses made in class.
12) Constantly listen to your own questions with the same critical listening ability you wish to instill in your students.

Question and answer is a method used between teacher and student based on assignments given by the teacher to improve the progress of the student in the subject matter. The question and answer method enables the teacher to determine whether or not the students understand the subject matter and whether or not they understand what they are saying. It has the disadvantages of permitting little or no interaction among the students, of possibly being threatening to some students and therefore creating an obstacle to their learning, and of being boring if the recitations merely go over material that is known to most of the class (Knowles and Overstreet, 1951, p. 41).

Leonard et al. (1972) stated that the function of asking questions is to:

- present fact,
- enhance students' experiences in their learning activities,
- identify the specific problem,
- develop the subject matter,
- develop students' interests and needs,
- involve students in learning activities, and
- make the learning activities useful.

The question and answer method is an effective way to hold attention and keep pertinent topics foremost in the student's mind. Although this method should not be used too frequently, it has several distinct advantages: it arouses student interest, it gets to the heart of certain problems, it serves as a quiz to ascertain extent of knowledge, and it promotes discussion. The question and answer method is teacher-oriented and offers very little opportunity for student exploration, but it can be valuable in conjunction with other methods (Daughtrey and Lewis, 1979, pp. 87-88).

The research suggests that all teachers should:

- Avoid using questions to introduce lessons.
- Delay questions about content until a knowledge base has been established.
- Use a combination of levels of questions, extending from recall to evaluation.
- Pause for at least three seconds following questions.
- Do not expect students to be able to guess what the teacher means.
- Address questions to individual students, using student's name.

- Keep content-oriented questions specific.
- Help students by modifying their inaccurate answers until they become acceptable.
- Encourage students to ask questions.
- Help students develop skills in asking questions.
- Listen carefully to student questions and respond using their content.
- Prior to making a reading assignment, showing a film, or taking a field trip, pose questions relative to the major concepts or objectives of that experience (Hensen, 1988, p. 101).

> The practicum is a method of teaching the discrepancy between the role of teacher as a reflective practitioner who exercises judgment and makes decisions about curriculum and instruction, however specifically defined, and the role of teacher as technician as one who carries out the dictates of government and school authority policies in an efficient manner (Zeichner, 1990, p. 100). The practicum environment needs to be simplified to allow for a focus on the skills to be learned rather than having the focus on keeping order (Zeichner, 1990, p. 110).

Zeichner (1990) stated that teachers need to gain acceptance and satisfaction from increasing student's knowledge and skills or to influence their teaching methods to apply learning experiences to learners. "There is an instrument that embodies a set of teaching skills which were derived from teacher effectiveness studies" (Zeichner, 1990, p. 113). "In addition to these changes in the content and organization of the practicum which aim to promote reflective teaching, various supervisory approaches have been reported which seek to foster capabilities of self-analysis" (Zeichner, 1990, p. 115).

Teaching/learning process

Teaching and learning are types of communication occurring between the teacher and learner. According to Dzyacky (1988, p. 16), "Organization exhibits two kinds of sociological communication relationships, a formal type which has a narrow range of communication alternatives carefully specified for communicators and the informal type which has the same characteristics but to a lesser degree." Learning is recognized as a

process of changing behavior, increasing knowledge and developing skills. Learning will take place when the learners are willing to improve their life situation.

> Learning is symbol of the confidence free people have in their ability to solve old problems and to grasp new opportunities to make the future better. Learning is a big idea as big as the capacities and interests all human beings, and as big as all the effort people make to live better (McCloskey, 1954, pp. 141-142).

> Learning is the skills of critical thinking; creative thinking; organizing, innovating, and evaluating experiences; reflecting upon life's meaning; predicting outcome; and comparing and contrasting information (Brehm, 1969, pp. 1-2).

Leonard (1979) indicated that learning will increase personal improvement through building on old experiences. He indicated that learners will be effected by learning environment conditions such as personal social system, personal habits, personal beliefs and social values.

> Method aside from the unified and significant action of the learning person is an imitation of true learning. Whatever be the method of the teacher, it must begin with the whole approach of learner to what is being learned. What number experience has the learner had, and what may be expected to need in the current year? What are his habits of self expression and what media does he prefer? What tasks does he perform or will he perform in the course of his daily life, and what knowledge do those tasks demand? What are his social needs and how is he meeting them? Such knowledge about the person who is learning is the beginning of fruitful learning (Melvin, 1944, p. 217).

> The adult learner of the future will be highly competent in deciding what to learn and planning and arranging his own learning. He will successfully diagnose and solve almost any problem or difficulty that arises. He will obtain help competently and quickly, but only when necessary (Rosenblum, 1985, p. 11).

Warren (1964) indicated that reading, knowing the learning situation, and listening are the most important elements in increasing the learning experience. He suggested the following points be included in order to involve students in learning activities.

- Identify several topics of study.
- Make the students recognize their responsibilities.

- Describe the contents to be included for every topic.
- Develop a general goal and objective for each topic.
- Fit the topic to student's interests and needs.
- Indicate several methods that can be used in every topic.

> The sources of all learning in all human relationships are the same. First, the more knowing person has something that the less knowing person wants or needs. Second, the more knowing person relates to the less knowing person's needs from both an internal and external frame of reference; internal in terms of the learner's reference, external in terms of content. Third, the more knowing person works in conjunction with the less knowing person to develop programmatic way to get the learner to achieve what he or she wants or needs (Carkhuff, 1981, p. 118).

> The method to be employed within the group after it is assembled is participation. In most cases the learning by doing elements are put to work. Learning by doing may come after lecture, demonstration, illustration, or use of various types of visual aids (Morgan et al., 1963, p. 52).

Teaching is recognized as a process for changing individual behaviors, attitudes, beliefs; create activities; and solve problems. "Place a premium on methods that can be used outside a one-to-one, on-the-job teaching situation, and on the development of skills related to words ad to abstractions" (Kirby, 1980, p. 19). "Teachers play an important part in helping develop attitudes, ambitions, moral and physical standards and other basic values that parents are concerned with in the development of their children" (Cardozier, 1967, p. 65). "The good teacher will always be secure, whatever political or administrative battles rage around the school system and it is upon the good teacher that the future of education depends (Dawson, 1984, p. 141).

Teachers want school to be a center of learning activities focused on learner's needs and provide opportunities for real learning condition.

> Teaching that is creative, interesting and challenging to students and results in students achieving a high level of mastery begins with a course of study that makes sense to students. The subject matter should pertain directly to the educational objectives of the course. The content of the course needs to be subdivided into instructional units that indicate clearly the usefulness of what is be learned and the course content must be

sequenced such that one can see and understand the logic underlying the organization of subject matter (Newcomb, 1986, pp. 26-27).

"Most teachers enjoy considerable freedom in what they teach, how they teach, where they go, how they dress, whether or not they join their own professional organizations" (Cardozier, 1967, p. 63). McCloskey (1954) confirmed that the teachers should have the following:

1. understand the social condition that the learners come from;
2. technical ability of teaching;
3. provide useful information for learners;
4. know the learner's areas of interests;
5. an ability to increase learner's knowledge and experience;
6. an ability to use an effective teaching methods; and
7. organizing the subject matter.

Boyle (1981) suggests three major approaches to teaching:

1. teachers present information to students through lecturing, talking informally, writing on the chalkboard, demonstrating, and showing audio-visual materials, such as films, filmstrips, slides and transparencies;
2. students work independently by reading, solving problems, writing reports, and doing research; and
3. interaction occurs between teachers and students and among students.

Each of these approaches provide opportunities for interacting through such experiences as listening, analyzing or critiquing (Boyle, 1981, pp. 213-214).

Phipps (1980, pp. 43-44) indicated that the basic factors of good teaching are based on:

Democracy: the first prerequisite of good teaching is democratic behavior by teachers. This means that teachers treat their students as they would like to be treated.

Use: Teachers and students should be primarily concerned with knowledge and skills which may be used now or in the near future.

Readiness: Readiness is closely related to use. It is useless to try to teach something to students before they are ready to learn it.

> The specific problem was to compare secondary teachers, who were differentiated by sex, age, teaching experience, teaching field, professional preparation, and grade level, in regard to role expectation of the teacher behavioral characteristics (Brannian, 1974, p. 4).

A study was done by Brannian (1974, p. 42) about classroom environment and how it is related to teacher characteristics. He indicated that:

> Some personality characteristics of teachers were related to demographic characteristics, age, number of years of teaching experience, number of children showed the strongest division among personality characteristics. Teachers who were younger or less experienced tended to see themselves as spontaneous, aggressive, self-confident, adaptable, out-going, independent, and self-assured. Words likely to describe the older, more experienced teachers were conventional, organized, cautious, patient, mild, thorough, and stable.
>
> Some of the personal characteristics rated necessary for a favorable image were:
> 1) ability to maintain discipline;
> 2) cooperation with school administrators;
> 3) cooperation with school staff;
> 4) enthusiasm for teaching; and
> 5) personal appearance and neatness"
> (Jipp, 1983, p. 6).

Heitz (1984) found that the teachers of high school agriculture were the second most important factors in influencing students to enroll in agricultural studies. "The teacher for agriculture is the catalyst to bring action to situation" (Cardozier, 1967, p. 64). Cardozier (1967) found that the agriculture teacher also has the ability to cooperate, judge, lead and plan for the community.

> The factors that had the greatest influence on their decision to enter the profession of teaching agriculture were:
> 1) desire to work with farm people;
> 2) experiences in farming or other agricultural occupations;
> 3) desire to work with rural youth;
> 4) opportunities for employment in agriculture;
> 5) high school vocational agriculture courses; and
> 6) security of agriculture occupation
> (Jipp, 1983, p. 5).

Charter (1912) stated that the function of teaching was to assist learners, to involve and appreciate learning, and to improve the values of life.

Method of teaching youth

The method of teaching in agriculture becomes the most important element to motivate students in learning activities. "Agricultural education in U. S. high schools usually does not extend beyond the offering of vocational agricultural programs" (Committee on Agricultural Education, 1988).

The Committee on Agricultural Education (1988) indicated that agriculture education programs develop classroom skills, agricultural knowledge, and development of membership in the agriculture organization. They continued their discussion by saying that learners in agriculture should be able to face and deal with changes which occur in the area of technology, industry, and other structural methods. The Committee indicated that agricultural education should provide the most important element of change in assisting learners in meeting their needs and interests and helping learners develop their skills and increase their knowledge in the following areas: crop production, farm management, marketing, and other areas. They believe that agricultural education should improve the learning environment and provide learning activities on and off the farm based on individual abilities.

Phipps (1980) stated that there are three major objectives of agricultural education. These three objectives are listed below:

1) Introduce the individual to the society.
2) Develop personal growth.
3) Develop a relationship between individuals and society according to their basic needs.

Agricultural education is recognized as a process which is concerned with helping youth improve themselves by increasing their knowledge, developing their skills, and changing their attitude and values. Agricultural education can take place in or out of the school setting. "The community school should provide a program to meet the educational needs of all the people of the community. For education in agriculture, the school should provide for the education of in-school pupils who are planning to farm; for out-of-school youth on farms, school dropouts and those who have graduated, and for adults who are engaged in farming, either as farm workers or as farm operators" (Thuston et al., 1964, p. 10).

Out of the school education is defined as a method of teaching to improve the instructor's skills in his/her teaching.

> It is simply a method if instruction just as the newly conceived modern media approach of television and other visual aid materials represent another new approach to improving instruction (Paterson, 1967, p. 28).

Paterson pointed out that outdoor education is recognized as a method of teaching in which he or she can influence the subject mater presented to his/her audience.

> Outdoor education is simply a method of teaching using the natural environment as a living laboratory, it provides an opportunity for direct teaching involving a full sensory rather than abstract approach to subject matter (Paterson, 1967, p. 28).

Clark (1968) gave ten principles about youth and their responsibilities in learning activities. These principles were:

1. All youth need to develop stable skills and those understandings and attitudes that make the worker an intelligent and productive participant in economic life. To this end, most youth need supervised work experience as well as education in the skills and knowledge of their occupations.

2. All youth need to develop and maintain good health and physical fitness.

3. All youth need to understand the right and duties of the citizen of democratic society, and to be diligent and competent in the performance of their obligations as members of the community and citizens of the state and nation.

4. All youth need to understand the significance of family for the individual and society and the condition conducive to successful family life.

5. All youth need to know how to purchase and use goods and services intelligently, understanding both the values received by the consumer and the economic consequences of their acts.

6. All youth need to understand the methods of science, the influence of science on human life, and the main scientific facts concerning the nature of the world and of man.

7. All youth need opportunities to develop their capacities to appreciate beauty in literature, art, music, and nature.

8. All youth need to be able to use their leisure time well and to budget it wisely, balancing activities that yield satisfactions to the individual with those that are socially useful.

9. All youth need to develop respect for other persons, to grow in their insight into ethical values and principles, and to be able to live and work cooperatively with others.

10. All youth need to grow in their ability to think rationally, to express their thoughts clearly, and to read and listen with understanding.

Method of teaching adults

This research has as one dimension, determining the most important methods which could be used with the teaching of adults. Adult education has no clear definition. For example, Verner (1962, p. 2) defined adult education as, "the action of an external educational agent in purposefully ordering behavior into planned systematic experience that can result in learning for those for whom such activities are supplemental to their primary role in society, etc." On the other hand, Morgan and others (1963) defined adult education as achieving the educational goal and objective in order to improve life conditions. Each person defines adult in a different way. There are many different situations that give us the meaning of adult education. These meanings are listed below as we know them from the notes taken of the course, *Foundations of Adult Education.*

1. The ability of adult to take responsibility for his/her life.

2. The ability of adult to define the sources of learning.
3. The ability of adult to develop a desire for learning.
4. The ability of adult to take learning as problem-centered.
5. The ability of adult to take learning as experience-centered.
6. The ability of adult to choose and make alternatives for his/her decisions.

> People enroll in adult education activities for many reasons: they want to be with other people, to visit, and have fun; they want answers to important questions and they want to learn new skills; they are curious about themselves and the world in which they live; they want people to know them as individuals; they want to get ahead. The purpose of adult education is not only to learn subject matter but the development of skills, attitudes and appreciations, and the opportunity for individual growth and development (Warren, 1964, p. 10).

One of the purposes of this study was to identify effective agricultural teaching methods to meet the needs of adults to continue developing their knowledge and skills and improve their life condition. Verner (1962, p. 68) related that "the method of education identifies the ways in which people are organized in order to conduct educational activity." He pointed out that the change which occurs in the adult's behavior is related to the use of different teaching methods. "At this level the primary orientation of the method is toward affecting changes in the behavior of individuals (Verner, 1962, p. 14).

Cole (1969) indicated that the methods which could be used for youth are similar to the methods which can be used for adults. The materials and methods used in adult education are often those of the school classroom and may well be inappropriate. The assumption is made that what was good enough for children will automatically be good for their parents (Coles, 1969, p. 90).

From the literature reviewed, it can be summarized that method of teaching is used as a technique of communication which actually occurred between instructors and learners. The method of teaching can be used to motivate learners to increase their

knowledge to change their situation in order to live in a better life situation. Teaching methods can be used in different levels of learning settings: "youth or adults," in "school or out of school," in "agricultural education" or any scientific area. Using teaching methods depends on many factors such as the teacher, student, material, and subject matter. Using agricultural teaching methods in an effective way could be one of the most important elements to develop student's knowledge to solve their problems and to improve their life problems and life conditions.

CHAPTER III. METHODS OF PROCEDURE

The primary purpose of this study was to identify the effective agricultural teaching methods used for adults and youth in Iowa. The objectives of the study were to assess: 1) the importance of selected instructional techniques, 2) teachers beliefs about their role in teaching, 3) teachers perceptions of the effectiveness of selected instructional methods in formal educational settings of youth and adults, and 4) reachers perceptions of the effectiveness of selected instructional methods in informal educational settings of youth and adults in Iowa. This chapter is divided into the following sections: Assumptions, Limitations, Definition of Terms, Research Design, Development of Questionnaire, Determining the Target Population, Selection of the Sample, and Data Collection and Analysis of Data.

Assumptions

- The data collected reflected the actual experiences of teachers who are using teaching methods in agriculture in both formal and informal education for youth and adults.
- The teachers recognized the statements and understood the questions as presented in the instrument.
- Teachers who were selected to participate in identifying effective agricultural teaching methods used by secondary agriculture teachers were knowledgeable about applying and using the teaching methods in formal and informal learning for both youth and adults.

Limitations

- This study was limited to those who teach high school agriculture in Iowa and who were willing to participate in this study.

- This study was limited to specifying the effectiveness of agricultural teaching methods used in a formal and informal way for both youth and adults in agriculture.
- Results may need to be interpreted in different ways depending on the respondent's interpretation of terms.
- Respondents may have interpreted terms used on the questionnaire differently.

Definition of terms

Adult	Individual who has full responsibility for his/her life condition and his/her family and has reached a specified minimum legal age of adulthood.
Formal Education	That education that occurs during a regularly scheduled time period within the confins of the traditional class setting and classroom.
Informal Education	That education that occurs outside of the formal classroom in nontraditional educational environments.
Methods	Instructional methods used in both formal and informal education for both youth and adults.
Teacher	An individual who develops methods of facilitating learning activities for learners.
Youth	An individual who participates in agricultural learning activities in formal and informal settings.

Research design

The study was descriptive in nature and was designed to involve people who teach agriculture in high schools in the state of Iowa. Of primary concern was determining the perceptions of teachers about the most effective agricultural teaching methods used by these teachers. This research design was selected because it was less expensive than any other methods, it gathered information from real situations; and it was commonly used in agricultural education (Borg and Gall, 1989).

The data were collected using a mailed questionnaire. The steps of the descriptive research design used in this study were described on page 423 of Brog and Gall (1989). These steps included: (1) defining objective, (2) selecting a sample, (3) writing items, (4) constructing the questionnaire, (5) pre-testing, (6) preparing a letter of transmittal, and (7) sending out the questionnaire and follow-ups.

Development of mailed questionnaire

Mailed questionnaires were the means employed to gather information on the research topic from the target population. The questionnaire focused on agricultural teaching methods used in formal and informal learning environments for both adults and youths, teachers perceptions of the importance of selected teaching techniques and teacher characteristics.

In developing the questionnaire (instrument) for this study, two main sources of information were used. These sources were: 1) the literature reviewed in Chapter Two, and 2) instructional methods used in adult and extension education programs in agriculture cited by Martin and Omer (1986).

The questionnaire consisted of four sections. The first section was designed to obtain the respondents' perceptions of the importance of using specific teaching techniques. Twenty-five questions were included in this section and the respondents used a five-point Likert-type rating scale from 5 (very important) to 1 (of no importance) to record their response to each question. The second section was designed to obtain the respondents' perceptions about the degree that the respondents believed they possessed selected teacher characteristics. Twenty-four questions were designed using a five-point Likert-type rating scale from 5 (very much) to 1 (none). The third section was designed to obtain the respondents' feelings about the effectiveness of methods of teaching in formal and informal educational settings for youth and adults. Eighteen questions were designed using a five-

point Likert-type rating scale from 5 (very effective) to 1 (of no effectiveness). The fourth section was designed to obtain the biographical information about the respondents and their teaching situation..

The mailed questionnaire was reviewed several times by the major advisor and submitted to the Human Subject Review Committee for approval.

Determining the target population

The target population for this study consisted of teachers who were working as high school agricultural teachers in Iowa. Information obtained from the Department of Agricultural Education at Iowa State University, identified all of the agriculture teachers in Iowa high schools. There was an approximate population of 248 teachers from which the sample was obtained.

Selection of the sample

Stratified sampling was the method used to select teachers to participate in the study. The research method selected for this study required an equal random sample from the six Iowa Vocational Agriculture Teachers Association districts. Fifteen teachers were selected from each of the six districts of Iowa. These districts were: Northeast District, Southeast District, Southwest District, North Central District, South Central District and Northwest District. The total sample was 90 teachers.

In selecting the sample from the overall population, a table of random numbers was utilized. A list of the current high school agriculture teachers with their addresses was obtained from the Department of Agricultural Education and studies at Iowa State University. The list was divided into six districts. Fifteen teachers were selected as a random sample from each district. The percentage of teachers selected from each district ranged from 34.09 to 38.46 percent. The questionnaires were sent to participants with a

cover letter indicating the importance of their responses, the purpose of the study, and the confidentiality of data. A stamped, self-addressed envelope was included for the return of the completed instrument.

Data collection

On the 10th of December, 1991, questionnaires were sent to 90 teachers of high school agriculture. All questionnaires contained of a cover letter explaining the purpose of the study, the importance of methods used in teaching agricultural in high schools, the types of information the respondents would provide for this study, the fact that their response was voluntary and would be kept in strict confidence, and an expression of appreciation for the respondents' cooperation (see Appendix A). Ten days after the first mailing, 20 percent of the questionnaires had been completed and returned. By the first part of January, 45 questionnaires (50%) were received from the December 10th mailing. On the 10th day of January, 1992, a follow-up letter was sent to correspondents to recover additional questionnaires (see Appendix B). On the 10th day of February, 1992, a complete set of material using another cover letter explaining the importance of returning this type of information in order to complete this research was sent to the yet non-responding teachers (see Appendix C). The total number of returned questionnaires after the third mailing was 71 (78.89 percent).

Analysis of data

Information provided by the respondents provided data about the perceptions of agriculture teachers concerning personal skills needed to be successful teachers, the importance of teacher's personal characteristics in teaching agriculture in high schools; methods of teaching used in formal and informal educational settings for both youth and adults and descriptive information about each teacher.

The data were analyzed at Iowa State University's Durham Center. The following statistical procedures were selected to analyze the data for this study. The level of significance was determined to be .05.

SPSS FREQUENCIES were used to identify the following:

1. Respondent's perceptions of the importance of selected teaching techniques.
2. Respondent's perceptions of the importance of selected teacher's characteristics.
3. Methods of teaching used in the following:
    a. Formal education for youth;
    b. Formal education for adults;
    c. Informal education for youth; and
    d. Informal education for adults.

SPSS ONEWAYS were used to provide information about the significant differences in teacher perceptions when compared by:

1. Areas of the state,
2. Years of teaching,
3. Age of the teacher.

A test was used to determine the significant differences between the level of teacher's education and their perceptions of the effectiveness of teaching methods used in formal and informal educational settings for both youth and adults.

Duncan Multiple Range tests were used to provide information about the significant differences between the mean or among mean scores for the following:

1. Areas of the state and the teachers' perceptions of the effectiveness of agricultural teaching methods used in high schools.
2. Years of teaching agriculture and the teachers' perceptions of the effectiveness of agricultural teaching methods used in high schools.
3. Age of teachers and the teachers' perceptions of the effectiveness of agricultural teaching methods used in high schools.

CHAPTER IV. FINDINGS

Respondent's perceptions of the importance of selected teaching techniques

Means, medians and modes for instructor perceptions of the importance of 25 selected teaching techniques are presented in Table 1. It was observed that all but two of the techniques were considered to be of "much" importance by the respondents. The two items that were considered of "some" importance were "require students to react to visitors" and "work with students as a friend." Those techniques with the highest mean scores were "involve students in the subject matter," "make the subject matter useful," "require students to participate in learning activities," "influence students by using different methods of teaching," and "adapt methods of teaching to the subject matter being taught."

Those techniques with mean scores of 4.0 were "share equally with learners," "use an objective in each lesson plan," "use teaching strategies carefully to improve learning," "mix students in learning activities," "develop a method of student feedback about their learning activities," "use an objective in each lesson plan," "share with students the objectives of the lesson," "make the learning place more comfortable," and "organize lesson plans."

Respondent's perception of the importance of selected teacher's characteristics

Respondent's perceptions of the importance of selected teacher characteristics are presented in Table 2. Of the 24 characteristics in the table, fifteen characteristics had mean scores above 4.0 (very much importance). One characteristic, "like students to call you by your first name," had a mean score of 1.5 (no importance).

Those characteristics with the highest mean scores were "believe in your teaching" (4.7), "have students participate in learning activities" (4.7), "help students develop their

Table 1. Instructor's perceptions of the importance of selected teaching techniques (N=71)

Teaching Techniques	Mean[a]	Standard Deviation
Involve student in subject matter	4.7	0.5
Require students to participate in learning activities	4.6	0.6
Share equally with learners	4.0	0.8
Mix students in learning activities	4.0	0.7
Make students react to visitors	3.3	1.0
Work with students as a friend	3.3	0.9
Make decisions democratically	3.6	1.0
Make the learning place more comfortable	4.0	0.8
Improve environmental learning conditions	4.1	0.8
Attend out-of-class school activities	3.8	0.8
Make learning activities satisfying to learners	4.3	0.6
Organize lesson plans	3.9	1.0
Use an objective in each lesson plan	4.0	0.8
Share with students objectives of each lesson	3.9	0.9
Influence students using different teaching methods	4.5	0.6
Make the subject matter useful	4.7	0.5
Enhance student's performance in subject matter by using different teaching methods	4.3	0.6
Adapt method of teaching to the subject matter being taught	4.4	0.6
Use tests to gain feedback from students on their learning activities	3.9	0.8
Adapt teaching goals to learner needs/interests	4.2	0.7
Develope a method of student feedback about their learning activities	4.0	0.7
Use many different methods to enhance student performance	4.1	0.7
Use different methods of teaching based on student needs and interests	4.3	0.6
Use teaching strategies carefully to improve learning	4.0	0.8
Use information in your teaching that will improve learner's life experiences	4.4	0.6

[a]Scale used to determine mean was: 1=no importance, 2=little importance, 3=some importance, 4 = important, 5= very important.

Table 2. Instructor's perceptions of the importance of selected teacher's characteristics (N=71)

Teacher's characteristics	Mean[a]	Standard Deviation
Have an interest in teaching	4.6	0.5
Believe in your teaching	4.7	0.5
Like to work in a group	4.3	0.8
Have students share in learning activities	4.6	0.5
Like students to participate in learning activities	4.7	0.5
Like to help students develop their knowledge of the subject matter?	4.7	0.5
Accept information from students	4.3	0.6
Accept suggestions from students	4.2	0.7
Like students to talk about their life problems	3.7	0.8
Talk with learners about their problems out of work?	3.7	0.9
Help students if they get into trouble	3.6	0.9
Know your student's feelings	4.0	0.7
Give students suggestions about their problems	3.5	0.8
Give students guidelines about their problems	3.6	0.8
Help students to find information	4.3	0.7
Get attention of your learners	3.8	0.9
Like students to call you by your first name	1.5	0.9
Like to visit students in their home	4.1	0.8
Meet student's parents	4.3	0.7
Know student's performance	4.2	0.7
Give students a high grade in their test	3.5	1.0
Know learner's interests	4.4	0.6
Know learner's needs	4.4	0.6
Have time to help students in their interest areas	3.9	0.9

[a]Scale used to determine means was: 1=no importance, 2=little importance, 3=some importance, 4=much importance, and 5=very much importance.

knowledge of the subject matter" (4.7), "have an interest in teaching" (4.6), and "have students share in learning activities" (4.6).

Other characteristics with high mean scores were "like to work in a group," "accept information from students," "accept suggestions from students," "know your students' feelings," "help students find information," "get attention from your learners," "visit students in their home," "meet students' parents," "know students' performance," "know your learners' interests," and "know your learners' needs." Median and mode values for these characteristics were 4.0 on a 5-point scale where a value of 4 represented "much importance."

Teachers perceptions of the effectiveness of methods of teaching used in formal education for youth

Data in Table 3 presents means and standard deviations of the respondent's perceptions of the effectiveness of methods of teaching used in formal educational settings with youth. Those methods perceived to be "very effective" with youth were: laboratory activities (mean = 4.5), demonstrations (mean = 4.4), projects (mean = 4.3), field trips (mean = 4.2), and problem-solving (mean = 4.2). Those methods that were effective with youth were: question and answer (mean = 3.9), illustrations (mean = 3.9), video cassettes (mean = 3.9), practicums (mean = 3.8), supervised study (mean = 3.6), and lectures (mean = 3.3). Those methods that were of little effectiveness with youth were: records and audio cassettes (mean = 2.6), surveys (mean = 2.7), and recitations (mean = 2.8). The largest standard deviations were observed for: surveys (1.0), recitations (.94), and illustrations (.90). It was further observed that 12 of the 18 methods studied had mean scores of 3.5 or higher (effective to very effective).

Table 3. Teacher perceptions of the effectiveness of methods of teaching used in formal education for youth[a]

Methods of teaching	Mean[b]	Standard Deviation
Lecture	3.3	0.7
Recitation	2.8	0.9
Laboratory	4.5	0.6
Question and answer	3.9	0.8
Demonstrations	4.4	0.6
Supervised study	3.7	0.9
Field trips	4.2	0.7
Practicum	3.8	0.8
Survey	2.7	1.0
Examinations	3.5	0.8
Projects	4.3	0.7
Discussions	4.1	0.7
Panel discussions	3.4	0.9
Conferences	3.3	1.0
Illustrations	3.9	0.9
Problem-solving	4.2	0.8
Video cassettes	3.9	0.7
Record and audio cassettes	2.6	1.0

[a]N ranged from 66 to 71.

[b]Scale values used to determine means was: 1=of no effectiveness, 2=of little effectiveness, 3=somewhat effective, 4=effective, and 5=very effective.

Teachers perceptions of the effectiveness of methods of teaching used in formal education for adults

Teachers perceptions of the effectiveness of methods of teaching used in formal educational settings of adults are presented in Table 4. Those methods that were perceived by the respondents to be most effective were: demonstrations (mean = 4.4), discussions (mean = 4.5), laboratory exercises (4.3), panel discussions (mean = 4.3), and problem-solving (mean = 4.0). Methods perceived to be least effective with adults were: recitations (mean = 2.6), examinations (mean = 2.7), and records and audio cassettes (mean = 2.7). Those methods that were "effective" with adults were: illustration (mean = 3.9), projects (mean = 3.8), video cassettes (mean = 3.8) and conferences (mean = 3.7). The largest variation of responses was observed for recitations, supervised study, practicums, surveys and examinations. Eleven of the 18 methods studied had mean scores of 3.5 or higher (effective to very effective).

Teachers perceptions of the effectiveness of methods of teaching used in informal education for youth

Data in Table 5 reveals the perceived effectiveness of methods of teaching when used in informal educational settings with youth. Those methods that were perceived to be most effective were: laboratory (mean = 4.4), demonstration (mean = 4.4), field trips (mean = 4.2), discussions (mean = 4.2), and problem-solving (mean = 4.0). Methods that were perceived to be "effective" in the use of teaching in informal education for adults were question and answer (mean = 3.9), panel discussions (mean = 3.9), illustration (mean = 3.9), problem-solving (mean = 3.9), projects (mean = 3.8), and practicums (mean = 3.7). Methods perceived to be least effective by the respondents with youth in informal settings were: recitation (mean = 2.4), surveys (mean = 2.6), records and audio cassettes (mean = 2.7), and lectures (mean = 2.8). The largest variation in responses was observed for supervised study (SD = 1.1), surveys (SD = 1.0), examinations (SD = 1.1), panel

Table 4. Teacher perceptions of the effectiveness of methods of teaching used in formal education for adults[a]

Methods of teaching	Mean[b]	Standard Deviation
Lecture	3.5	0.7
Recitation	2.6	1.1
Laboratory	4.3	0.8
Question and answer	3.9	0.8
Demonstrations	4.4	0.6
Supervised study	3.1	1.1
Field trips	4.2	0.8
Practicum	3.7	1.2
Survey	2.9	1.1
Examinations	2.7	1.1
Projects	3.8	1.0
Discussions	4.4	0.7
Panel discussions	4.3	0.8
Conferences	3.6	0.9
Illustrations	3.9	0.9
Problem-solving	4.1	1.0
Video cassettes	3.8	0.7
Record and audio cassettes	2.7	1.0

[a]N ranged from 47 to 51.

[b]Scale values used to determine means was: 1=of no effectiveness, 2=of little effectiveness, 3=somewhat effective, 4=effective, and 5=very effective.

Table 5. Teachers perceptions of the effectiveness of methods of teaching used in informal education for youth[a]

Methods of teaching	Mean[b]	Standard Deviation
Lecture	2.8	1.0
Recitation	2.4	1.0
Laboratory	4.4	0.7
Question and answer	3.9	0.9
Demonstrations	4.4	0.6
Supervised study	3.4	1.1
Field trips	4.2	0.8
Practicum	3.8	0.9
Survey	2.6	1.0
Examinations	2.8	1.1
Projects	4.1	0.9
Discussions	4.2	0.8
Panel discussions	3.2	1.2
Conferences	3.4	1.1
Illustrations	3.9	0.9
Problem-solving	4.0	0.9
Video cassettes	3.7	1.1
Record and audio cassettes	2.7	1.0

[a]N ranged from 57 to 61.

[b]Scale values used to determine means was: 1=of no effectiveness, 2=of little effectiveness, 3=somewhat effective, 4=effective, and 5=very effective.

discussions (SD = 1.2), conferences (SD = 1.1), and video cassettes (SD = 1.1). Only seven of the methods studied were perceived by the respondents to be either effective or very effective (3.5 or greater).

Teachers perceptions of the effectiveness of methods of teaching used in informal education for adults

Perceptions of the respondents about the effectiveness of methods of teaching used in informal educational settings with adults are presented in Table 6. Those methods perceived to be most effective were: discussions (mean = 4.4), demonstrations (mean = 4.4), field trips (mean = 4.3), and laboratory (mean = 4.2). Those methods considered to be of least importance were: examinations (mean = 2.5), recitation (mean = 2.5), surveys (mean = 2.8), and records and audio cassettes (mean = 2.7). Standard deviation of 1.0 or greater was observed for eleven of the eighteen methods studied. It was observed that 12 methods studied had mean scores of 3.5 or greater.

Educational background of respondents

To ascertain whether the perceptions of teachers about the effectiveness of tteaching methods studied differed according to their educational background the respond-ents were placed in two groups. One group included teachers who held bachelors degrees (n=43, 60.6%) and the other group included teachers who held masters degrees (n=38, 34.4%).

When comparing the effectiveness of teaching methods used in formal educational settings for youth in Table 7, it was observed that respondents with masters degrees had higher mean scores than respondents with bachelors degrees for supervised study, field trips, practicums, surveys, examinations, projects, panel discussions, and records or audio cassettes. The greatest variation in responses of respondents with bachelors degrees was observed for surveys, supervised study, and records and audio cassettes. The greatest

Table 6. Teacher perceptions of the effectiveness of methods of teaching used in informal education for adults[a]

Methods of teaching	Mean[b]	Standard Deviation
Lecture	3.1	1.1
Recitation	2.5	1.2
Laboratory	4.2	0.9
Question and answer	3.9	0.9
Demonstrations	4.4	0.7
Supervised study	3.2	1.2
Field trips	4.2	0.8
Practicum	3.7	1.2
Survey	2.8	1.1
Examinations	2.5	1.1
Projects	3.8	1.1
Discussions	4.4	0.7
Panel discussions	3.9	1.1
Conferences	3.7	1.0
Illustrations	3.9	0.9
Problem-solving	3.9	1.0
Video cassettes	3.6	1.0
Record or audio cassettes	2.7	1.0

[a]N ranged from 47 to 50.

[b]Scale values used to determine means was: 1=of no effectiveness, 2=of little effectiveness, 3=somewhat effective, 4=effective, and 5=very effective.

Table 7. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for youth grouped by level of respondents' education

Methods of Teaching	Bachelor's Degree N = 43	Master's Degree N = 28	t-value	t-probability
Lecture	3.4[a] .7[b]	3.2 .7	1.23	.22
Recitation	2.8 .8	2.8 1.1	.10	.92
Laboratory	4.5 .6	4.5 .6	.05	.96
Question & answer	3.9 .8	3.9 .8	.06	.95
Demonstration	4.5 .6	4.4 .6	.55	.58
Supervised study	3.6 1.0	3.7 .8	-.31	.76
Field trips	4.1 .7	4.2 .8	-.19	.85
Practicum	3.8 .8	3.9 .9	-.85	.40
Survey	2.6 1.0	2.8 1.0	-.88	.38
Examinations	3.5 .7	3.6 1.0	-.37	.71
Projects	4.2 .6	4.3 .8	-.50	.62
Discussions	4.1 .6	4.0 .8	.97	.34
Panel discussions	3.3 1.0	3.4 1.0	-.12	.91
Conferences	3.3 .9	3.3 1.1	.03	.97
Illustrations	4.0 .9	3.8 1.0	1.00	.32
Problem solving	4.2 .8	4.1 .8	.51	.61
Video cassettes	4.0 .7	3.9 .7	-.71	.48
Record or audio cassettes	2.5 1.0	2.7 1.0	-1.05	.30

[a]Mean.
[b]Standard deviation.

variation in responses of respondents with masters degrees was observed for recitation, examinations, panel discussions, and conferences.

While there were differences between means for the methods studied, none were significantly different.

Means, standard deviation, t-values and t-probabilities for the perceptions of the effectiveness of agricultural teaching methods used in formal education for adults grouped by level of respondents' education are presented in Table 8. It was observed for those respondents with a bachelors degree that laboratory, demonstrations, field trips, discussions, projects and problem-solving had the highest mean scores. For respondents with a masters degree, it was observed that those methods with high mean scores were similar to those of respondents with bachelors degrees with the exception of "illustrations."

For respondents with bachelors degrees, recitation, surveys, examinations and records or audio cassettes were of little effectiveness as instructional methods for adults in formal educational settings. Similar observations were made for respondents holding masters degrees. One method (recitations) was observed to have a t-value that was significant at the .05 level. Both means for this level were quite low (2.89 and 2.86, respectively) suggesting that this method was of little effectiveness when used in formal educational settings for adults.

Data in Table 9 reveal the perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for youth grouped by respondents' educational background. Both groups perceived that laboratory, demonstrations, field trips, projects, discussions, and problem-solving were the most effective teaching methods to use in informal educational settings. Those methods considered to be least effective in these settings were: records and audio cassettes, examinations, surveys, lectures, and recitations. Greatest variation in responses among respondents with bachelor's degrees

Table 8. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for adults grouped by level of respondents' education

Methods of Teaching	Bachelor's Degree N = 28	Master's Degree N = 23	t-value	t-probability
Lecture	3.5[a] .8[b]	3.5 .6	.07	.95
Recitation	2.9 1.3	2.3 .8	2.11	.04
Laboratory	4.3 .7	4.2 1.0	.44	.66
Question & answer	4.0 .9	3.8 .8	.59	.56
Demonstration	4.3 .7	4.5 .6	-1.49	.14
Supervised study	3.1 1.3	3.1 1.0	-.17	.87
Field trips	4.2 .8	4.3 .8	-.13	.90
Practicum	3.8 1.2	3.7 1.2	.44	.67
Survey	2.8 1.2	3.0 1.1	-.48	.63
Examinations	2.8 1.2	2.5 1.1	.65	.52
Projects	4.0 .6	3.6 1.1	1.27	.21
Discussions	4.5 .7	4.4 .7	.13	.90
Panel discussions	4.2 .8	4.3 .8	-.37	.71
Conferences	3.6 .9	3.7 .9	-.25	.81
Illustrations	3.8 1.0	4.0 .8	-.75	.46
Problem-solving	4.0 1.1	4.2 .8	-.65	.52
Video cassettes	3.8 .8	3.9 .7	.09	.93
Record or audio cassettes	2.7 1.1	2.7 .8	-.10	.92

[a]Mean.
[b]Standard deviation.

Table 9. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for youth grouped by level of respondents' education

Methods of Teaching	Bachelor's Degree N = 35	Master's Degree N = 26	t-value	t-probability
Lecture	2.9[a] 1.0[b]	2.7 1.0	.74	.46
Recitation	2.5 1.0	2.3 .9	.66	.51
Laboratory	4.3 .7	4.5 .6	-.86	.39
Question & answer	4.1 .8	3.8 .4	1.46	.15
Demonstration	4.4 .7	4.5 .6	-.29	.77
Supervised study	3.3 1.1	3.5 1.1	-.75	.46
Field trips	4.2 .8	4.1 .8	.29	.77
Practicum	3.8 .9	3.8 .8	.17	.86
Survey	2.4 1.0	2.8 1.0	-1.65	.11
Examinations	3.0 1.1	2.6 1.0	1.40	.17
Projects	4.2 .9	4.0 .9	.09	.93
Discussions	4.2 .8	4.1 .7	.46	.65
Panel discussions	3.2 1.1	3.2 1.3	-.08	.94
Conferences	3.5 1.1	3.3 1.3	.66	.51
Illustrations	3.9 1.0	3.9 .8	.02	.99
Problem-solving	4.1 1.1	4.9 .7	.58	.57
Video cassettes	3.5 1.2	3.8 .9	-1.02	.31
Record or audio cassettes	2.6 .9	2.8 1.0	-1.02	.31

[a]Mean.
[b]Standard deviation.

were observed for supervised study, examinations, conferences, problem-solving, and video cassettes.

Perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for adults grouped by level of respondents' education are presented in Table 10. Both groups perceived discussions, field trips, demonstrations, and laboratory activities to be effective methods to use in informal educational settings. Methods perceived to be least effective were lectures, recitations, surveys, examinations and the use of records or audio cassettes. Respondents with bachelors degrees did perceive question and answer situations as being effective in informal educational settings.

One method (recitations) was observed to have a t-value that was significant at the .05 level. Both means for this method were quite low (2.89 and 2.1, respectively) suggesting that this method was of little effectiveness when used in informal educational settings.

Respondent's experience in teaching agriculture

To ascertain whether the perception of the respondents about the effectiveness of the teaching methods studied differed according to their experience in teaching agriculture in high schools, the respondents were placed in three groups. Group One included respondents who had from one to ten years of experience (N = 29, 40.84%). Group Two included respondents who had 11 years to 20 years of agricultural teaching experience (N = 29, 40.85%). Group Three included respondents who had 21 or more years of teaching experience (N = 13, 18.31%).

When comparing the effectiveness of teaching methods used in formal educational settings for youth in Table 11, it was observed that respondents in Group One had higher mean scores than did respondents in Group Two for laboratory, projects, illustration, video cassettes, and discussion. The greatest variation in response of respondents with 21 or

Table 10. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for adults grouped by level of respondents' education

Methods of Teaching	Bachelor's Degree N = 27	Master's Degree N = 23	t-value	t-probability
Lecture	3.3[a] 1.1[b]	2.9 1.2	1.21	.23
Recitation	2.9 1.3	2.1 .9	2.49	.02
Laboratory	4.3 .7	4.1 1.2	.60	.55
Question & answer	4.0 .9	3.8 1.0	.67	.51
Demonstration	4.3 .7	4.5 .6	-.97	.36
Supervised study	3.2 1.3	3.1 1.2	.42	.68
Field trips	4.4 .7	4.1 .8	1.39	.17
Practicum	3.9 1.0	3.5 1.3	1.18	.24
Survey	2.7 1.2	2.9 1.0	-.42	.68
Examinations	2.7 1.2	2.2 1.0	1.39	.17
Projects	4.0 1.0	3.5 1.1	1.46	.15
Discussions	4.5 .6	4.3 .9	.91	.37
Panel discussions	3.8 1.2	4.0 1.1	-.55	.58
Conferences	3.8 1.1	3.6 1.0	.60	.55
Illustrations	3.8 1.0	3.9 .9	-.36	.72
Problem-solving	3.9 1.2	4.0 .8	-.12	.91
Video cassettes	3.5 1.2	3.7 .8	-.82	.42
Record or audio cassettes	2.7 1.0	2.7 .9	-.10	.92

[a]Mean.
[b]Standard deviation.

Table 11. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for youth grouped by teacher's teaching experience

Teacher method	Group 1[a]	Group 2[b]	Group 3[c]	F- Value	F-Probability
Lecture	3.5[d] .8[e]	3.2 .6	3.2 .8	2.05	.14
Recitation	3.0 .8	2.6 1.0	2.9 1.0	1.79	.18
Laboratory	4.6 .6	4.5 .6	4.4 .5	.35	.70
Question and answer	3.9 .8	3.9 .8	4.0 .7	.15	.86
Demonstrations	4.4 .7	4.5 .5	4.4 .5	.50	.61
Supervised study	3.8 .7	3.5 1.0	3.8 1.2	.99	.38
Field trips	4.1 .8	4.2 .7	4.2 .8	.16	.85
Practicum	3.8 .7	3.8 1.6	3.9 1.0	.10	.91
Survey	2.5 1.0	2.7 .7	3.1 1.3	1.43	.25
Examination	3.6 .9	3.3 .7	3.7 1.0	1.33	.27
Projects	4.3 .6	4.1 .8	4.6 .5	2.18	.12
Discussions	4.1 .6	3.9 .8	4.3 .6	1.06	.35
Panel discussions	3.4 .9	3.3 1.0	3.5 1.1	.29	.75
Conferences	3.6 1.0	3.6 .9	3.2 1.1	1.95	.15
Illustration	4.1 .7	3.7 1.0	4.1 .9	1.63	.21
Problem-solving	4.2 .8	4.2 .8	4.2 .7	.03	.97
Video cassettes	4.0 .7	3.9 .7	3.9 .8	.27	.77
Record or audio cassettes	2.4 1.0	2.7 1.0	2.8 .9	.84	.44

[a]Group 1, teachers with one to ten years experience, N = 28.
[b]Group 2, teachers with 11 to 20 years of experience, N = 28.
[c]Group 3, teachers with 21 or more years of experience, N = 13.
[d]Mean.
[e]Standard deviation.

more years of experience was observed for supervised study, surveys, panel discussions, and conferences. I was further observed that respondents with 21 years of experience and over had higher mean scores than the other two respondent groups for the effectiveness of question and answer, projects, and discussions. It was observed that problem-solving has the same mean score for all three respondent groups. While there were differences between means for the methods studied, none were significantly different.

Means, standard deviations, F-ratio and F-probabilities for the perceptions of the effectiveness of agricultural teaching methods used in formal educational settings for adults grouped by respondent experiences in teaching agriculture in high school are presented in Table 12. It was observed for those respondents in Group One (0-10 years of experience), question and answer, projects, discussions, illustration, and problem-solving had the highest mean scores. It was further observed for those respondents in Group Two (11 to 20 years of experience) that laboratory and field trips had the highest mean scores. The highest mean score for respondents in Group Three (21 and over years of experience) was observed for panel discussions. For respondents with all three groups, recitation and audio cassettes were of little effectiveness as instructional methods for adults in formal education settings.

One method (supervised study) was observed to have a F-probability that was significant at the .05 level. All means for this method were quite low (2.4, 3.0, and 3.6 respectively) suggesting that this method was between "little" and "somewhat effective" when used in formal educational settings for adults. Duncan's multiple range test revealed that Group One rated supervised study significantly higher than Groups Two and Three.

Data in Table 13 reveal the perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for youth grouped by respondents' teaching experience. It was observed that respondents who were beginning teachers to those with ten years of teaching experience in the field of agricultural education had the highest mean

Table 12. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for adults grouped by teacher's teaching experience

Teacher method	Group 1[a]	Group 2[b]	Group 3[c]	F- Value	F-Probability
Lecture	3.5[d]	3.5	3.7	.19	.83
	.8[e]	.8	.5		
Recitation	2.9	2.3	2.7	1.50	.23
	1.1	1.2	.7		
Laboratory	4.2	4.4	4.2	.36	.70
	1.0	.7	.8		
Question and answer	4.1	3.8	3.7	1.01	.37
	.7	.9	1.0		
Demonstrations	4.4	4.4	4.2	.36	.70
	.6	.6	.8		
Supervised study	3.6	3.0	2.4	3.42	.04
	1.1	1.2	.7		
Field trips	4.1	4.4	4.0	1.38	.26
	.7	.7	1.0		
Practicum	3.7	3.9	3.3	.81	.45
	1.3	1.0	1.3		
Survey	3.1	2.8	3.0	.34	.71
	1.2	1.0	1.2		
Examination	3.0	2.6	2.2	1.55	.22
	1.2	1.1	1.0		
Projects	4.1	3.8	3.4	1.18	.32
	.9	1.0	1.1		
Discussions	4.7	4.3	4.4	1.15	.33
	.5	.8	.7		
Panel discussions	3.9	4.4	4.7	2.86	.07
	.9	.8	.5		
Conferences	3.6	3.7	3.4	.34	.72
	.8	1.0	1.1		
Illustration	4.1	3.7	4.0	.67	.52
	.7	1.1	.9		
Problem-solving	4.2	4.1	3.8	.67	.52
	.7	1.2	.7		
Video cassettes	3.9	3.8	3.7	.39	.68
	.8	.7	.9		
Record or audio cassettes	2.9	2.6	2.6	.56	.57
	1.0	1.0	.9		

[a]Group 1, teachers with one to ten years experience, N = 17.
[b]Group 2, teachers with 11 to 20 years of experience, N = 23.
[c]Group 3, teachers with 21 or more years of experience, N = 9.
[d]Mean.
[e]Standard deviation.

Table 13. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for youth grouped by teacher's teaching experience

Teacher method	Group 1[a]	Group 2[b]	Group 3[c]	F- Value	F-Probability
Lecture	2.8[d] 1.0[e]	2.7 .9	3.0 1.2	.33	.72
Recitation	2.6 1.0	2.3 1.0	2.6 1.0	.46	.64
Laboratory	4.4 .5	4.3 .8	4.5 .7	.27	.77
Question and answer	4.0 .9	3.9 .9	3.9 .8	.06	.94
Demonstrations	4.4 .7	4.4 .7	4.5 .7	.29	.75
Supervised study	3.7 .9	3.3 1.2	3.1 1.1	1.79	.18
Field trips	4.1 .9	4.1 .8	4.4 .8	.71	.50
Practicum	3.7 .7	3.8 1.1	4.0 .9	.36	.70
Survey	2.4 1.0	2.5 .9	2.9 1.2	.73	.49
Examination	3.0 1.1	2.6 1.1	2.8 1.1	.71	.50
Projects	4.1 .8	3.9 .9	4.3 1.0	.81	.45
Discussions	4.2 .9	4.1 .7	4.2 .7	.12	.89
Panel discussions	3.3 1.1	3.0 1.2	3.4 1.2	.45	.64
Conferences	3.6 1.1	3.6 .9	2.8 1.0	2.66	.0789
Illustration	4.1 .7	3.8 .9	3.9 1.1	.63	.54
Problem-solving	4.0 1.0	4.0 1.1	4.2 .7	.22	.81
Video cassettes	3.8 1.1	3.7 1.1	3.5 1.2	.41	.67
Record or audio cassettes	2.7 .8	2.6 1.2	2.9 .9	.22	.81

[a]Group 1, teachers with one to ten years experience, N = 22.
[b]Group 2, teachers with 11 to 20 years of experience, N = 25.
[c]Group 3, teachers with 21 or more years of experience, N = 13.
[d]Mean.
[e]Standard deviation.

scores for question and answer and illustrations. Group Three (respondents with 21 and over years of teaching experience) perceived that laboratory, demonstrations, field trips, practicum, projects, and problem-solving were the most effective teaching methods to use in informal educational settings. Those methods considered to be least effective in these settings were: lecture, recitation, survey, and recorders and audio cassettes. While there were differences between means for the methods studied, none were significantly different.

Perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for adults grouped by respondents' teaching experience are presented in Table 14. It was observed that for respondents with 1-10 years of teaching experience, projects, illustration, and problem-solving had the highest mean scores when compared with the other two groups. The highest mean scores for respondents in Group Two (11-20 years of teaching experience) were observed for demonstration and field trips. The highest mean scores for respondents in Group Three (21 and over years of teaching experience) were observed for laboratory, discussion, and panel discussion.

Supervised study was observed to have a F-probability that was significant at the .05 level. All means for this method were quite low (2.3, 3.1, and 3.7, respectively) suggesting that this method was of somewhat effectiveness to little effectiveness when used in informal educational settings for adults. A Duncan's test revealed that Group One respondents rated supervised study as being significantly higher than did Groups Three and Two respondents.

It was further observed that discussions had an F-probability that was significant at the .05 level. All means for this method were quite high (4.1, 4.6 and 4.8, respectively) suggesting that this method was effective when used in informal educational settings for adults. A Duncan's test revealed that Groups Three and One respondents rated discussions significantly higher than did Group Two respondents.

Table 14. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for adults grouped by teacher's teaching experience

Teacher method	Group 1[a]	Group 2[b]	Group 3[c]	F- Value	F-Probability
Lecture	3.2[d] 1.1[e]	3.0 1.1	3.2 1.3	.26	.77
Recitation	2.8 1.1	2.3 1.2	2.7 1.0	1.03	.37
Laboratory	4.1 1.0	4.2 1.0	4.4 .7	.36	.70
Question and answer	4.1 .8	3.9 1.0	3.7 1.0	.51	.60
Demonstrations	4.3 .8	4.5 .6	4.4 .7	.55	.58
Supervised study	3.7 1.0	3.1 1.3	2.3 .9	4.49	.02
Field trips	4.1 .8	4.4 .7	4.2 1.0	.45	.64
Practicum	3.5 1.2	3.8 1.3	3.7 1.0	.36	.70
Survey	2.9 1.1	2.6 1.0	3.1 1.4	.81	.45
Examination	2.9 1.2	2.3 1.1	2.0 1.0	2.13	.13
Projects	4.0 .9	3.7 1.2	3.6 1.1	.73	.49
Discussions	4.6 .5	4.1 .9	4.8 .4	3.67	.03
Panel discussions	3.9 1.0	3.6 1.3	4.6 .7	2.57	.09
Conferences	3.5 1.2	3.9 .9	3.6 1.1	.68	.51
Illustration	4.1 .7	3.6 1.1	4.0 .9	1.12	.34
Problem-solving	4.0 1.0	3.9 1.2	3.9 .8	.05	.96
Video cassettes	3.7 1.1	3.5 1.0	3.7 1.2	.18	.84
Record or audio cassettes	2.9 .9	2.5 1.1	2.8 .7	.89	.42

[a]Group 1, teachers with one to ten years experience, N = 17.
[b]Group 2, teachers with 11 to 20 years of experience, N = 23.
[c]Group 3, teachers with 21 or more years of experience, N = 9.
[d]Mean.
[e]Standard deviation.

Respondent's age

To ascertain whether the perceptions of respondents about the effectiveness of the teaching methods studied differed according to their ages, the respondents were placed in four groups. Group One included respondents 20-30 years of age (N = 16, 22.54%), Group Two included respondents 31-40 years of age (N = 32, 45.07%), Group Three included respondents 41-50 years of age (N = 11, 15.49%), and Group Four included respondents 51 and over (N = 12, 16.9%).

When comparing the effectiveness of teaching methods used in formal educational settings for youth (Table 15), it was observed that respondents 51 years and over of age had higher mean scores than the other respondent groups for projects, illustration, problem-solving, and video cassettes. Respondents of 20 to 30 years old had higher mean scores than other groups for laboratory. The highest mean scores for all groups, were observed for laboratory exercises, demonstrations, and field trips. Those methods considered to be least effective in these settings were recitation, surveys, and records and audio cassettes.

One method (question and answer) was observed to have a F-probability that was significant at the .05 level. Means for this method ranged from (3.7 to 4.5) suggesting that this method was from "somewhat effective" to "effective" when used in formal educational settings for youth. A Duncan's test revealed that Group Three respondents rated "questions and answer" as an instructional method significantly higher than respondents in the other three groups.

Means, standard deviations, F-ratio and F-probabilities for the perceptions of the effectiveness of agricultural teaching methods used in formal education for adults grouped by teachers' ages are presented in Table 16. It was observed for those respondents in Group One (20 to 30 years old), question and answer, demonstrations, field trips,

Table 15. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for youth grouped by teacher's age

Teacher Methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	F-Value	F-Prob.
Lecture	3.3[e]	3.3	3.1	3.6	.93	.43
	.9[f]	.6	.5	1.0		
Recitation	2.9	2.6	2.6	3.3	1.91	.14
	.7	1.0	.7	1.1		
Laboratory	4.6	4.5	4.5	4.4	.52	.65
	.5	.6	.5	.7		
Question & answer	3.9	3.7	4.5	3.9	3.08	.03
	.8	.7	.7	.8		
Demonstrations	4.5	4.4	4.5	4.4	.18	.91
	.6	.6	.5	.7		
Supervised study	3.7	3.7	3.5	3.8	.32	.81
	.8	.9	1.0	1.2		
Field trips	4.2	4.2	4.1	4.2	.04	.99
	.8	.7	.7	.8		
Practicum	3.8	3.8	4.0	3.8	.19	.91
	.8	.8	.9	.9		
Survey	2.3	2.7	2.9	3.0	1.53	.22
	1.0	.9	1.2	1.1		
Examination	3.7	3.4	3.4	3.8	1.21	.31
	.9	.8	.8	1.0		
Projects	4.4	4.1	4.4	4.6	1.41	.25
	.6	.8	.5	.7		
Discussions	4.2	3.9	4.2	4.3	1.10	.36
	.5	.8	.8	.8		
Panel discussions	3.4	3.1	3.5	3.8	1.89	.14
	.7	.9	.8	1.2		
Conferences	3.6	3.1	3.1	3.3	.83	.48
	1.0	1.0	.7	1.2		
Illustration	4.1	3.7	3.9	4.2	1.20	.32
	.8	1.0	.8	.9		
Problem-solving	4.1	4.0	4.5	4.5	1.58	.20
	.6	.9	.7	.7		
Video cassettes	3.9	4.0	3.6	4.3	2.05	.12
	.8	.6	.7	.8		
Record and	2.4	2.5	2.6	2.9	.63	.60
audio cassettes	1.0	1.0	1.0	1.1		

[a]Group 1, respondents 20 to 30 years of age, N = 16.
[b]Group 2, respondents 31 to 40 years of age, N = 30.
[c]Group 3, respondents 41 to 50 years of age, N = 11.
[d]Group 4, respondents 51 years of age or older, N = 12.
[e]Mean.
[f]Standard deviation.

Table 16. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for adults grouped by teacher's age

Teacher Methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	F-Value	F-Prob.
Lecture	3.2[e]	3.6	3.3	3.7	1.18	.33
	.8[f]	.7	.8	5		
Recitation	3.1	2.5	2.4	2.6	.76	.52
	1.2	1.3	.8	.8		
Laboratory	4.4	4.2	4.6	4.1	.64	.60
	.7	.9	.5	.9		
Question & answer	4.1	3.8	4.0	3.9	.30	.82
	.8	.8	1.2	.7		
Demonstrations	4.5	4.3	4.3	4.4	.28	.49
	.5	.6	.8	.8		
Supervised study	3.9	3.2	2.0	2.9	4.63	.01
	1.1	1.1	1.0	.7		
Field trips	4.4	4.3	4.0	4.1	.46	.71
	.7	.7	.8	1.1		
Practicum	4.1	3.6	4.0	3.4	.66	.58
	1.0	1.2	1.4	1.0		
Survey	2.8	3.0	3.0	2.9	.06	1.0
	1.2	1.1	1.2	1.1		
Examination	3.2	2.7	2.3	2.1	1.56	.21
	1.2	1.1	1.0	1.2		
Projects	4.3	3.7	4.3	3.1	2.89	.05
	.7	1.0	.8	.9		
Discussions	4.7	4.4	4.4	4.4	.34	.79
	.5	.8	.8	.8		
Panel discussions	3.9	4.3	4.1	4.9	2.19	.10
	.9	.8	.7	.4		
Conferences	3.7	3.7	3.6	3.4	.20	.90
	.7	1.0	1.0	.8		
Illustration	4.2	3.8	3.7	4.1	.84	.48
	.7	1.0	1.0	.7		
Problem-solving	4.1	4.1	4.1	3.9	.14	.93
	.6	1.1	.9	.7		
Video cassettes	4.0	3.9	3.3	4.1	1.92	.14
	.7	.7	.8	.7		
Record and	2.6	2.6	2.7	3.0	.36	.78
audio cassettes	.5	1.0	1.0	1.2		

[a]Group 1, respondents 20 to 30 years of age, N = 9.
[b]Group 2, respondents 31 to 40 years of age, N = 26.
[c]Group 3, respondents 41 to 50 years of age, N = 7.
[d]Group 4, respondents 51 years of age or older, N = 7.
[e]Mean.
[f]Standard deviation.

practicum, discussion, and illustrations had the highest mean scores. Respondents in Group Three (41 to 50 years old) gave laboratory the higest mean score. Respondents in Group Four (51 years and older) rated panel discussions and video cassettes highest. Recitation, examination, and record and audio cassettes had low mean scores for all four groups.

Supervised study was observed to have a F-probability that was significant at the .05 level. All means for this method were quite low (2.0, 2.9, 3.2, and 3.9, respectively) suggesting that this method was of "little" to "somewhat effective" when used in formal educational settings for adults. A Duncan's test revealed that Groups One and Two respondents perceived supervised study to be significantly more effective than did respondents in Groups Three and Four.

Projects was observed to have a F-probability that was significant at the .05 level. The means for this method ranged from (3.1 to 4.3) suggesting that this method was "somewhat effective" to "effective" when used in formal educational settings for adults. A Duncan's test revealed that respondents in Groups One and Three rated projects significantly different than respondents in Groups Two and Four.

Data in Table 17 reveal the perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for youth grouped by respondent age. Group One perceived that conferences and illustrations were the most effective teaching methods to use in informal educational settings for youth. Group Three perceived that question and answer, practicum, and projects were the most effective teaching methods to use in informal educational settings for youth. Group 4 perceived that laboratory, demonstrations, field trips, and video cassettes were the most effective teaching methods to use in informal educational settings for youth. Those methods considered to be least effective in this setting were lectures, recitations, surveys, examinations, and record and audio cassettes.

Table 17. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for youth grouped by teacher's age

Teacher Methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	F-Value	F-Prob.
Lecture	2.6[e]	2.7	2.9	3.2	.77	.52
	1.2[f]	.8	1.2	1.1		
Recitation	2.4	2.4	2.2	2.7	.52	.67
	1.1	.9	.8	1.6		
Laboratory	4.4	4.3	4.4	4.6	.43	.73
	.5	.7	.7	.7		
Question & answer	4.2	3.7	4.4	3.8	2.47	.07
	.8	.9	.7	.6		
Demonstrations	4.6	4.3	4.3	4.7	1.90	.14
	.5	.7	.7	.7		
Supervised study	3.8	3.4	3.2	3.0	1.08	.36
	1.3	1.0	.8	1.3		
Field trips	4.2	4.0	4.2	4.6	1.45	.24
	.9	.8	.7	.7		
Practicum	3.7	3.7	4.4	3.8	1.20	.32
	.9	1.0	.5	.9		
Survey	2.2	2.5	2.6	3.0	1.32	.28
	.9	.8	1.3	1.3		
Examination	3.1	2.7	2.6	2.9	.50	.68
	1.3	.9	1.2	1.2		
Projects	4.2	3.8	4.6	4.1	2.10	.11
	.7	.9	.5	1.1		
Discussions	4.5	4.0	4.1	4.3	1.17	.33
	.7	.8	.6	.8		
Panel discussions	3.2	3.0	3.1	3.8	1.16	.34
	1.3	1.1	1.1	1.3		
Conferences	4.2	3.5	2.9	2.9	4.27	.01
	.8	1.0	1.3	.9		
Illustration	4.2	3.8	3.6	4.0	.95	.42
	.7	.9	1.0	.9		
Problem-solving	4.1	3.9	4.0	4.1	.11	.95
	.8	1.1	1.3	.7		
Video cassettes	3.7	3.9	2.4	4.1	5.72	.0017
	1.0	1.0	1.0	1.1		
Record and	2.7	2.5	2.7	3.3	1.94	.13
audio cassettes	.8	1.0	1.0	1.0		

[a]Group 1, respondents 20 to 30 years of age, N = 13.
[b]Group 2, respondents 31 to 40 years of age, N = 27.
[c]Group 3, respondents 41 to 50 years of age, N = 9.
[d]Group 4, respondents 51 years of age or older, N = 11.
[e]Mean.
[f]Standard deviation.

Conferences were observed to have a F-probability that was significant at the .05 level. Means for this method ranged between 2.9 and 4.2 suggesting that this method was from "little effectiveness" to "effective" when used in informal educational settings for youth. A Duncan's test revealed that Group One respondents had a significantly higher mean score than did respondents in Groups Two, Three, and Four.

Video cassettes were observed to have a F-probability that was significant at the .05 level. Means for this method ranged between 2.4 and 4.1 suggesting that this method was from "little effectiveness" to "effective" when used in informal educational settings for youth. The post-hoc test revealed that the mean scores for respondents in Groups One, Two, and Four were significantly different from the mean scores for respondents in Group Three.

Data in Table 18 reveal the perceptions of the effectiveness of agricultural teaching methods used in informal educational setting for adults grouped by respondent's ages. Group One perceived that question and answer, illustration, and problem-solving were the most effective teaching methods to use in informal educational settings for adults. Group Three perceived that laboratory, practicum, and projects were the most effective teaching methods to use in informal educational settings for adults. Respondents in Group Four perceived that discussion, panel discussion, and video cassettes were the most effective teaching methods to use in informal educational settings for adults. Those methods considered to be least effective in these settings were recitation, surveys, and record and audio cassettes.

Supervised study was observed to have a F-probability that was significant at the .05 level. Mean scores for this method ranged between 2.1 and 3.9 suggesting that this method was from "little effectiveness" to "somewhat effective." Duncan's post hoc test revealed that means for respondents in Groups One and Two were significantly different than means for respondents in Groups Three and Four.

Table 18. Teachers perceptions of the effectivess of agricultural teaching methods used in informal education for adults grouped by teacher's age

Teacher Methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	F-Value	F-Prob.
Lecture	2.9[e]	3.2	3.1	3.3	.18	.91
	1.5[f]	.9	1.4	1.4		
Recitation	2.8	2.4	2.4	2.6	.22	.88
	1.5	1.2	.9	1.1		
Laboratory	3.9	4.2	4.7	4.1	1.05	.38
	1.3	.9	.5	.9		
Question & answer	4.2	3.8	4.0	3.9	.45	.72
	.7	1.0	1.2	.7		
Demonstrations	4.6	4.4	4.4	4.6	.32	.81
	.5	.7	.8	.8		
Supervised study	3.9	3.3	2.1	2.6	3.50	.02
	1.3	1.1	.9	1.2		
Field trips	4.4	4.2	4.3	4.3	.34	.80
	.7	.7	.8	1.0		
Practicum	3.8	3.5	4.4	3.4	1.22	.32
	1.3	1.3	.5	1.0		
Survey	2.6	2.8	3.0	2.9	.22	.88
	1.1	1.0	1.4	1.2		
Examination	3.0	2.6	2.1	1.6	2.71	.06
	1.2	1.1	1.1	.8		
Projects	4.2	3.6	4.4	3.0	3.33	.03
	1.0	1.0	.8	1.0		
Discussions	4.6	4.3	4.3	4.9	1.41	.25
	.5	.8	.8	.4		
Panel discussions	3.2	3.9	3.4	4.9	3.53	.02
	1.1	1.1	1.3	.4		
Conferences	3.9	3.7	3.4	3.6	2.83	.84
	.9	1.0	1.6	1.0		
Illustration	4.2	3.7	3.7	4.0	.76	.52
	.7	1.1	.8	.8		
Problem-solving	4.2	3.9	3.9	3.7	.34	.80
	.7	1.1	1.5	.8		
Video cassettes	3.9	3.6	2.4	4.3	5.62	.00
	.9	.9	1.1	.8		
Record and	2.4	2.6	2.7	3.1	.78	.51
audio cassettes	.9	1.0	1.0	1.1		

[a]Group 1, respondents 20 to 30 years of age, N = 9.
[b]Group 2, respondents 31 to 40 years of age, N = 26.
[c]Group 3, respondents 41 to 50 years of age, N = 7.
[d]Group 4, respondents 51 years of age or older, N = 7.
[e]Mean.
[f]Standard deviation.

Projects were observed to have a F-probability that was significant at the .05 level. Means for this method ranged between 3.1 and 4.4 suggesting that this method was "somewhat effective" to "effective." A post hoc test revealed that mean scores for respondents in Groups One and Three were significantly different from mean scores for Groups Two and Four.

Panel discussions were observed to have a F-probability that was significant at the .05 level. Means for this method ranged from 3.2 to 4.9 suggesting that this method was "somewhat effective" to "effective." A post hoc test revealed that mean scores for respondents in Group Four were significantly different from mean scores for Groups One, Two and Three.

Video cassettes were observed to have a F-probability that was significant at the .05 level. Means for this method ranged between 2.4 and 4.3 suggesting that this method was of "little effectiveness" to "effective." A post hoc test revealed that mean scores for respondents in Groups One, Two and Four were significantly different than the mean score for Group Three.

Iowa agricultural education areas

To ascertain whether the perception of teachers about the effectiveness of the teaching methods studied differed according to the area of the state in which the respondents taught, the state was divided into six groups. These groups were: Group 1, Southwest (N = 12, 16.9%); Group 2, Southeast (N = 11, 15.5%); Group 3, South Central (N = 14, 19.7%); Group 4, Northwest (N = 11, 15.5%); Group 5, Northeast (N = 13, 18.3%); and Group 6 (North Central, (N = 10, 14%).

Perceptions of the effectiveness of agricultural teaching methods used in formal educational settings for youth grouped by areas of the state are presented in Table 19. Group 1 (Southwest) perceived laboratory and demonstrations to be effective methods to

Table 19. Teachers perceptions of the effectiveness of agricultural teaching methods used in formal education for youth grouped by area of the state

Teacher methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	Group 5[e]	Group 6[f]	F-Vari.	F-Prob.
Lecture	3.6[g]	3.1	3.5	3.2	3.2	3.2	.86	.51
	.8[h]	.5	.7	1.0	.7	.6		
Recitation	2.7	2.8	2.9	3.2	2.8	2.4	.77	.57
	1.2	1.0	.9	1.0	.7	.8		
Laboratory	4.7	4.5	4.4	4.5	4.5	4.2	1.17	.33
	.5	.5	.6	.7	.5	.4		
Question and answer	4.0	4.1	3.6	4.0	4.1	3.6	.98	.44
	.7	1.0	.7	.7	.8	.5		
Demonstrations	4.7	4.5	4.3	4.3	4.5	4.2	1.29	.28
	.5	.5	.5	.6	.7	.6		
Supervised study	3.8	3.6	3.8	3.9	3.5	3.3	.75	.59
	1.0	.8	1.0	.8	1.0	.8		
Field trips	4.2	4.2	3.9	4.4	4.2	4.2	.43	.83
	.8	1.0	.8	.7	.7	.4		
Practicum	4.1	4.0	3.6	4.1	3.8	3.4	1.22	.31
	1.0	.9	.8	.9	.8	.5		
Survey	2.9	3.0	2.5	2.5	2.5	2.8	.58	.71
	1.3	1.0	1.1	.5	1.0	.8		
Examinations	3.9	4.0	3.4	3.6	3.0	3.3	2.71	.03
	.7	.8	.9	1.0	.8	.7		
Projects	4.4	4.5	4.5	4.3	4.3	3.8	1.38	.24
	.5	.7	.7	.8	.6	.9		
Discussions	4.1	4.2	4.1	4.1	4.0	3.9	.30	.91
	.9	.8	.8	.7	.6	.6		
Panel discussions	3.7	3.8	3.1	3.2	3.3	3.1	1.17	.33
	1.1	.9	1.0	1.1	.7	.9		
Conferences	3.5	3.6	3.1	3.7	3.0	2.7	1.8	.13
	1.0	1.0	.9	1.2	.7	1.2		
Illustration	3.6	4.0	3.9	4.1	3.8	4.1	.46	.81
	1.1	.8	.8	1.0	.8	1.0		
Problem-solving	4.3	4.2	4.0	4.5	4.2	4.1	.65	.66
	.9	.8	.8	.7	.6	1.0		
Video cassettes	3.8	4.2	4.1	4.0	3.7	3.9	.85	.52
	.6	1.0	.6	.6	.6	.7		
Record and audio cassettes	2.5	3.0	2.4	2.5	2.8	2.3	.84	.53
	.8	1.3	.9	1.2	.6	1.7		

[a]Group 1, Southwest, N = 12.
[b]Group 2, Southeast, N = 11.
[c]Group 3,South Central, N = 13.
[d]Group 4,Northwest, N = 11.
[e]Group 5, Northeast, N = 13.
[f]Group 6, North Central, N = 10.
[g]Mean.
[h]Standard deviation.

use in formal educational settings for youth. Group 2 (Southeast) perceived examinations, discussions, and video cassettes to be effective methods to use in formal educational settings for youth. Group 4 (Northwest) perceived field trips and problem-solving to be effective methods to use in formal educational settings for youth according to the mean scores. Methods perceived to be least effective were recitation, survey, and record and audio cassettes.

One method (examinations) was observed to have F-probability that was significant at the .05 level. All means (3.0, 3.3, 3.4, 3.6, 3.9 and 4.0, respectively) suggested that this method was between somewhat effective to effective when used in formal educational settings for youth. The post-hoc test as the group means revealed that means for respondents from Groups One and Two were signficantly different from the mean scores for Groups Three, Four, Five and Six.

Data in Table 20 reveal the perceptions of the effectiveness of agricultural teaching methods used in formal educational settings for adults grouped by respondents areas. Group 1 (Southwest) perceived that laboratory, question and answer, demonstrations, practicum, discussions, panel discussions, and illustrations were the most effective teaching methods to use in formal educational settings for adults. Group 2 (Southeast) perceived projects as the most effective teaching methods to use in formal educational settings for adults. Group 4 (Northwest) perceived field trips and Group 6 (North Central) perceived problem-solving as the most effective teaching method to use in formal educational settings for adults. Those methods considered to be least effective were: recitation, surveys, and record and audio cassettes.

One method (field trips) was observed to have an F-probability that was significant at the .05 level. Group means ranged from 3.8 to 4.7, suggesting that this method was between "somewhat effective" to "effective" when used in formal educational settings for

Table 20. Perceptions of the effectiveness of agricultural teaching methods used in formal education for adults grouped by area of the state

Teacher methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	Group 5[e]	Group 6[f]	F-Vari.	F-Prob.
Lecture	3.6[g]	3.9	3.2	3.4	3.5	3.9	1.25	.30
	.8[h]	.4	.9	.9	.7	.4		
Recitation	2.1	3.0	2.1	2.9	3.0	2.6	1.24	.31
	.9	1.3	.7	1.6	.8	1.4		
Laboratory	4.9	4.4	4.2	4.5	3.9	3.9	1.85	.12
	.4	.5	.7	.8	1.3	.4		
Question and answer	4.1	4.0	3.8	3.8	3.8	4.0	.25	.94
	1.1	.8	.9	.9	.9	.6		
Demonstrations	4.7	4.5	4.4	4.4	4.2	4.1	.79	.57
	.5	.8	.5	.7	.8	.4		
Supervised study	3.1	3.1	2.8	3.7	3.0	3.0	.55	.74
	1.7	1.4	1.1	1.1	.9	.8		
Field trips	4.7	4.6	3.9	4.7	3.8	4.1	2.57	.04
	.8	.5	.7	.5	.8	.9		
Practicum	4.2	3.5	3.6	4.0	3.8	3.4	.41	.84
	1.0	1.4	1.2	1.0	1.2	1.3		
Survey	3.4	2.7	2.8	2.7	3.0	2.9	.40	.84
	1.1	1.0	1.6	1.0	1.4	1.2		
Examinations	3.0	3.3	2.3	2.9	2.5	2.1	1.10	.38
	1.4	1.3	.7	1.2	1.2	.9		
Projects	4.0	4.3	3.9	3.7	3.8	3.3	.78	.57
	1.1	.7	.7	1.4	1.0	1.0		
Discussions	4.9	4.5	4.2	4.1	4.6	4.4	1.08	.38
	.4	.8	.8	.7	.7	.8		
Panel discussions	4.7	4.5	3.9	4.0	4.3	4.3	1.21	.32
	.5	.8	.9	.8	.9	.8		
Conferences	3.9	3.8	3.7	3.9	3.3	3.4	.44	.82
	1.1	.7	1.0	1.1	1.0	.8		
Illustration	3.9	4.1	4.0	3.7	3.7	4.0	.30	.91
	1.1	.8	.9	1.4	.7	.8		
Problem-solving	3.6	4.3	4.0	4.1	4.1	4.4	.63	.68
	1.5	.9	.8	1.1	.7	.8		
Video cassettes	3.5	4.1	3.9	4.1	3.6	3.7	.90	.49
	.5	1.1	.7	.4	.7	.8		
Record and audio cassettes	2.4	2.5	2.5	2.9	3.0	2.7	.45	.81
	1.1	1.2	1.0	.7	.9	1.0		

[a]Group 1, Southwest, N = 7.
[b]Group 2, Southeast, N = 8.
[c]Group 3,South Central, N = 10.
[d]Group 4,Northwest, N = 7.
[e]Group 5, Northeast, N = 10.
[f]Group 6, North Central, N = 7.
[g]Mean.
[h]Standard deviation.

adults. The post-hoc test of the group means revealed that means for Groups 2 and 4 were significantly different than the means for Groups 1, 3, 5 and 6.

Data in Table 21 reveal the perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for youth grouped by respondents' area of the state. Group 1 (Southwest) perceived that laboratory, demonstrations, and discussions were the most effective teaching methods to use in informal educational settings for youth. Group 2 (Southeast) perceived that illustration was the most effective teaching method to use in informal educational settings for youth. Group 3 (South Central) perceived that problem-solving was the most effective teaching method to use in informal educational settings for youth. Group 5 (Northeast) perceived that question and answer and projects were he most effective teaching method to use in informal educational settings for youth. Those methods considered to be least effective in this setting were recitation, survey, examinations, and record and audio cassettes.

While there were differences between means for the methods studied, none were significantly different.

Means, standard deviations, F-ratio, and F-probabilities for the perceptions of the effectiveness of agricultural teaching methods used in informal educational settings for adults grouped by respondents' areas are presented in Table 22. It was observed for those respondents in Group 1 that laboratory, demonstrations, and practicum had the highest mean scores. For respondents in Group 2, field trips, projects, and illustrations had the highest mean scores. For respondents in Group 4, conferences and video cassettes had the highest mean scores. For respondents in Group 5, panel discussion had the highest mean scores. For respondents in Group 6, question and answer had the highest mean scores. The method considered to be least effective in these settings was examinations.

One method (field trips) was observed to have an F-probability that was significant at the .05 level. Mean scores ranged from 3.8 to 4.8, suggesting that this method was

Table 21. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for youth grouped by area of the state

Teacher methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	Group 5[e]	Group 6[f]	F-Vari.	F-Prob.
Lecture	2.7[g]	3.1	2.8	3.1	2.6	2.6	.52	.76
	1.3[h]	2.1	.8	1.0	1.0	.8		
Recitation	2.3	2.7	2.3	2.3	2.6	2.3	.35	.88
	1.3	1.1	.9	.9	.7	1.1		
Laboratory	4.6	4.3	4.2	4.5	4.5	4.3	.65	.66
	.5	.8	.8	.5	.7	.5		
Question and answer	3.7	4.6	3.8	4.0	4.4	3.7	1.10	.37
	1.2	.9	.9	.5	.7	.8		
Demonstrations	4.8	4.5	4.4	4.4	4.3	4.1	1.06	.39
	.4	.7	.7	.5	.8	.7		
Supervised study	3.3	3.1	3.3	4.1	3.3	3.4	.89	.50
	1.6	1.4	1.6	.6	.9	.8		
Field trips	3.8	4.3	4.1	4.3	4.2	4.3	.54	.74
	1.0	.8	.8	.7	.7	.8		
Practicum	4.0	3.9	3.5	4.0	4.0	6.0	.65	.66
	1.1	.9	1.0	1.0	.6	1.0		
Survey	2.9	2.5	2.1	2.5	2.5	3.0	1.04	.41
	1.3	.8	.9	.5	1.3	.8		
Examinations	2.9	3.1	2.6	2.9	3.0	2.3	.67	.65
	1.2	1.5	.8	.8	1.0	1.0		
Projects	3.8	4.1	3.9	4.1	4.3	4.0	.43	.83
	1.3	1.1	.8	.6	.9	.6		
Discussions	4.4	4.3	4.2	4.3	4.0	3.9	.60	.70
	.8	.8	.7	.7	.8	.7		
Panel discussions	2.8	3.4	3.4	3.6	3.3	3.0	.49	.78
	1.6	1.4	1.1	1.2	1.6	.8		
Conferences	3.9	3.7	3.4	3.9	3.1	2.7	1.73	.14
	1.1	1.0	1.0	1.4	1.0	1.0		
Illustration	3.8	4.1	3.8	3.8	3.8	4.0	.20	.96
	1.0	1.0	.8	1.0	.8	.8		
Problem-solving	3.7	4.0	4.1	4.4	4.2	3.6	.83	.54
	1.3	.9	.7	.7	.6	.4		
Video cassettes	3.3	3.9	3.7	3.6	3.8	3.6	.33	.89
	1.2	1.3	.9	1.2	.8	1.5		
Record and audio cassettes	2.5	3.0	2.4	2.9	2.8	2.6	.57	.72
	1.2	1.2	.9	1.0	.6	1.0		

[a]Group 1, Southwest, N = 10.
[b]Group 2, Southeast, N = 10.
[c]Group 3,South Central, N = 13.
[d]Group 4,Northwest, N = 8.
[e]Group 5, Northeast, N = 13.
[f]Group 6, North Central, N = 7.
[g]Mean.
[h]Standard deviation.

Table 22. Teachers perceptions of the effectiveness of agricultural teaching methods used in informal education for adults grouped by areaof the state

Teacher methods	Group 1[a]	Group 2[b]	Group 3[c]	Group 4[d]	Group 5[e]	Group 6[f]	F-Vari.	F-Prob.
Lecture	2.7[g]	3.5	2.8	3.4	3.1	3.3	.64	.67
	1.1[h]	1.3	1.0	1.3	.9	1.1		
	2.8	2.9	2.4	2.7	2.7	2.4	.51	.77
Recitation	.8	1.7	1.0	1.5	.7	1.4		
	4.7	3.8	4.4	4.4	4.0	4.1	1.05	.40
Laboratory	.5	1.4	.5	.8	1.3	.7		
	3.9	4.0	3.7	3.7	3.9	4.4	.57	.72
Question and answer	1.4	.8	1.0	1.0	.9	.5		
	4.7	4.5	4.5	4.3	4.3	4.3	.46	.81
Demonstrations	.5	.5	.7	.8	.8	.8		
	2.9	3.1	3.1	3.9	2.9	3.3	.64	.67
Supervised study	1.8	1.8	.9	.9	1.0	.8		
	4.4	4.8	3.9	4.6	3.8	4.3	2.56	.04
Field trips	.8	.5	.7	.5	.8	.8		
	4.2	3.6	3.5	4.0	3.6	3.4	.41	.84
Practicum	1.0	1.3	1.3	1.0	1.1	1.5		
	3.0	2.6	2.6	2.7	2.9	3.0	.23	.95
Survey	1.2	1.0	1.2	.8	1.3	1.3		
	2.6	2.7	2.4	2.6	2.5	2.0	.30	.91
Examinations	1.0	1.5	.9	1.1	1.2	1.0		
	3.4	4.0	3.9	3.6	3.8	3.7	.29	.92
Projects	1.4	1.3	.9	1.3	.9	.8		
	4.3	4.5	4.5	4.3	4.5	4.3	.19	.97
Discussions	1.1	.8	.5	.8	.7	.8		
	3.9	3.6	3.7	3.9	4.2	3.9	.26	.93
Panel discussions	1.4	1.4	1.3	.9	1.0	1.1		
	3.6	4.1	3.7	4.4	3.4	2.9	2.30	.06
Conferences	1.0	.8	1.1	.5	1.1	1.1		
	3.6	4.3	4.0	3.9	3.7	3.9	.48	.79
Illustration	1.0	.5	.9	1.5	.7	1.1		
	3.3	4.1	4.0	4.1	4.0	4.0	.67	.65
Problem-solving	1.4	.8	.8	1.2	.7	1.4		
	3.1	3.8	3.7	4.0	3.6	3.1	.81	.55
Video cassettes	1.1	1.6	1.0	.6	.5	1.2		
Record and audio	2.4	2.6	2.3	3.1	2.9	3.7	.82	.54
cassettes	1.1	1.3	1.0	.7	.6	1.0		

[a]Group 1, Southwest, N = 7.
[b]Group 2, Southeast, N = 8.
[c]Group 3,South Central, N = 11.
[d]Group 4,Northwest, N = 7.
[e]Group 5, Northeast, N = 10.
[f]Group 6, North Central, N = 7.
[g]Mean.
[h]Standard deviation.

between somewhat effective and effective when used in informal educational settings for adults. The post hoc test revealed that mean scores for Groups 2, and 4 were significantly different from the mean scores for Groups 1, 3, 5, and 6.

Summary of Major Findings

This section provides the following brief summary of the major findings of the study.

1. Of the 25 teaching techniques studied, the five techniques which ranked highest were: involving students in subject matters, making the subject matter useful, making the students participate in learning activities, influencing students by using different methods of teaching, and adapting methods of teaching to the subject matter being taught.
2. Of the 24 statements for "teacher's perceptions of the importance of selecting teaching characteristics," the five characteristics which ranked highest were: required students to participate in learning activities, enjoy helping students to develop their knowledge about the subject matter, believe in their teaching, have an interest in their teaching, and like to help students if they get into trouble.
3. Of the 24 statements for "teachers' perceptions of the importance of selecting teacher's characteristics," the second highest mean scores were to: help students in their interest areas, get attention from learners, talk with their learners about learner's problems out of work, talk about students' life problems, and give students guidelines about their problems.
4. Of the 24 statements for "teachers' perceptions of the importance of selecting teacher's characteristics, the lowest mean score was for calling the teachers by their first names.

5. Perceptions of the respondents revealed that: laboratory, demonstrations, field trips and discussions were effective methods to use with both youth and adults.
6. When the 18 methods studied were compared by the level of teacher's education, in formal education settings for youth the highest mean scores were observed for respondents who had masters degrees and for laboratory activities, field trips, demonstrations, projects, discussions, and problem-solving.
7. When the 18 methods studied were compared by level of teachers education in formal educational settings for adults, the highest mean scores were observed for teachers who had bachelors degrees and for laboratory, demonstrations, field trips, discussions, projects, and problem-solving.
8. When the 18 methods studied were compared by level of teachers education in informal educational setting for youth, the highest mean scores for both groups were observed for question and answer, demonstrations, field trips, projects, discussions, and problem-solving.
9. When the 18 methods studied were compared by level of teachers education in informal educational settings for adults, the highest mean scores for both groups were observed for discussions, field trips, demonstrations, and laboratory.
10. A significant difference occurred between teachers who had masters degrees and teachers who had bachelors degrees in the study for recitation as a method used in formal and informal educational settings for adults.
11. When the 18 methods studied were compared by respondent's experience in teaching in formal and informal educational settings for both youth and adults the highest mean scores were observed for projects, problem-solving, field trips, and laboratory.
12. When the 18 methods studied were compared by respondent's experience in teaching in formal and informal educational settings for both youth and adults, the

lowest mean scores were observed for survey, recitation, and record and audio cassettes.

13. A significant difference occurred between groups of teachers who had experience in teaching supervised study as a method used in formal educational settings for adults.
14. Significant differences occurred between groups of teachers who had experience in teaching through supervised study and discussions when used in informal educational settings for adults.
15. When the 18 methods studied were compared by respondent's ages in formal and informal educational setting for both youth and adults, the highest mean scores were observed for projects, laboratory, and video cassettes.
16. When the 18 methods studied were compared by respondent's ages in formal and informal educational settings for both youth and adults, the lowest mean scores were observed for recitation, survey, and record and audio cassettes.
17. A significant difference occurred between respondent groups when grouped by teachers' age for question and answer as a method of teaching used in formal educational settings for youth.
18. Significant differences occurred between respondent groups when grouped by teachers' age for supervised study and projects used in formal educational settings for adults.
19. A significant difference occurred between groups for conferences and video cassettes as methods of teaching used in informal educational setting for youth when compared by age of respondent.
20. Significant differences occurred between groups for supervised study, projects, panel discussions, and video cassettes as methods of teaching used in informal educational settings for adults when compared by age of respondents.

21. When the 18 methods studied were compared by respondent's geographical location in Iowa in formal and informal educational settings for both youth and adults, the highest mean scores were observed for laboratory activities and demonstrations.
22. Significant differences occurred between groups of respondents grouped by geographical areas of Iowa for examinations as a method of teaching used in formal educational settings for youth and for field trips as a method used in formal and informal educational settings for adults.

CHAPTER V. DISCUSSION

The main objective of this study was to identify effective agricultural teaching methods used for both adults and youth in Iowa. The primary objectives of this study were to develop a basic understanding of:

a) The importance of selected instructional techniques.

b) The degree to which teachers should possess selected teacher's characteristics.

c) The effectiveness of selected instructional methods in formal educational settings of youth and adults.

d) The effectiveness of selected instructional methods in informal educational settings of youth and adults.

The design of this study was effective in accomplishing the objectives. It effectively sampled teachers of agriculture in secondary schools in the state of Iowa. Three major areas considered to obtain responses from respondents were: the importance of selected instructional techniques and the degree to which selected teacher characteristics were used by the respondents, and the effectiveness of teaching methods used by the respondents in formal and informal educational settings for both youth and adults.

In the biographical information section, there were two items requested and not used in the analysis: gender and the portion of time that the teachers were involved in teaching. Gender comparisons were not made because the number of females who participated in this study were quite low. The portion of time that the respondents were involved in teaching was reported by the respondents as percentages. The accuracy of the information provided by the respondents was considered questionable by the investigator and was not used in the overall analysis of the data.

Objective one of this study was to determine the importance of selected instructional techniques. A review of the findings pertaining to this objective resulted in the following major observations. There were large variations in responses for "work with students as a friend" (mean 3.3) and "involve students in the subject matter" (mean 4.7). Large standard deviations were observed for "making students react to visitors," "making decisions democratically," and "organizing lesson plans." For five items -- "involving students in subject matter," "making the subject matter useful," "making students participate in learning activities," "influencing students using different teaching methods," and "adapting method of teaching to the subject matter being taught" -- the mean scores were between "very important" and "important."

Carkhuff (1981) found that teacher's effectiveness in using instructional techniques depends on the manner of handling subject matter and use of teaching methods. Hong (1981) found that the teaching technique can develop a positive attitude toward learning. But, Zverev (1983) found that using teachers' technique could be used to develop interest in the subject matter.

These findings suggest that instructional techniques can be used to motivate students to react to the learning activities, increase their learning experience in the subject matter, and increase the number of students enrolled in agricultural education. The findings also suggest that the selection of instructional techniques can be used to create a high level of satisfaction in learning by the learners and increase their recognition of the role of the subject matter in solving their life situations. Rosenblum (1985) indicated that learners will be able to solve their problems when they are influenced by different instructional techniques. These findings support the findings of Spitze (1970) when he found that an appropriate technique can be used effectively in involving students in the subject matter and encouraging students to participate in learning activities.

Objective two of this study was to determine the importance instructor's placed on selected teacher's characteristics. A review of the findings pertaining to this objective resulted in the following major observations. There was a large variation in responses for "teachers believe in teaching" (mean = 4.7) and "teachers like students to call them by their first name" (mean = 1.5). Large standard deviation was observed for "teachers give students a high grade in their tests." For "believing in their teaching," "requiring students to participate in learning activities," "helping students develop their knowledge of the subject matter," "having an interest in teaching," "having students share in learning activities," "knowing their learner's interests," and "knowing their learner's needs," instructors perceived them to be from "important" to "much importance." Warren (1964) found that through knowing the learning situation was one way of increasing the learning experience. He found that the subject matter should fit the student's interests and needs. McCloskey (1954) indicated that the teacher should have ability in teaching, know the learner's areas of interest, and have the ability to increase learners' knowledge and experience.

These findings suggest that teacher's characteristics could be used in different ways in helping instructors develop their knowledge and ability in teaching in order to develop learner's interests in learning and increase the impact of the learning experience. These findings appear to be similar to those of Melvin (1944) when he found that teachers can influence the students' knowledge according to teacher's strength in the subject matter.

Objective three of the study was to determine the effectiveness of methods of teaching used in formal educational settings for both youth and adults. The review of the findings pertaining to this objective resulted in the following major observations. For five items -- laboratory, demonstrations, field trips, problem-solving, and discussion -- the mean scores were between "effective" and "very effective." Leonard et al. (1972)

pointed out that demonstration is a method used to involve students, provide information, and create observation. Stewart (1930) found that laboratory, demonstration, field trips, and discussions can be used as an effective method in agriculture education. Cargin (1983) pointed out that problem-solving can be used in agriculture education for youth and adults.

These findings suggest that methods of teaching used in formal educational settings for both youth and adults could be used to solve a problems using the laboratory activities; field trips to stimulate the students' interests about the subject matter; demonstrations to provide strong motivation and use of materials; problem-solving to create thinking; and discussions to make the subject matter clear.

Objective four of this study was to determine the effectiveness of methods of teaching used in informal educational settings for both youth and adults. The review of the findings pertaining to this objective resulted in the following major observation. For five methods -- laboratory, demonstration, field trips, problem-solving, and discussion -- the mean scores were between "effective" and "very effective." Coles (1969) indicated that methods which could be used for youth could be used for adults.

These findings suggest that methods of teaching used in informal educational settings for both youth and adults could be used to share ideas through "discussions", to identify problem "demonstrations," to establish a relationship between what students learn in class and what they observe out of class on "field trips," and to develop understanding in the "laboratory." Thurston et al. (1964) stated that the purpose of method used is to develop skill, learn the subject matter and to develop individual growth and development. Verner (1962) found that the changes which occur in youth and adults' behavior could be the result of the use of different teaching methods.

In this study, several descriptive factors were studied to determine the influences they had on the respondents' perceptions about the effectiveness of the methods studied.

Analysis were conducted to try to single out their influences on teaching methods used in formal and informal educational settings for both youth and adults. The date revealed significant differences and possible influences when compared by "level of education," "teacher's experience in teaching," "teacher's age," and by "area of the state in which the respondent taught."

Significant differences were found for the method "recitations" when used in teaching in formal and informal educational settings for adults when compared by level of teacher's education. It is suggested that "recitations" could be used as a method of teaching to stimulate students' interest through a discussion of different viewpoints about the subject matter.

Significant differences were found for using "supervised study" and "discussion" as a method of teaching in formal and informal educational settings for adults when grouped by teacher's experiences in teaching. Brannian (1974) suggested that biographical information such as age and teaching experience could make a difference in teacher's characteristics. These findings suggest that "supervised study" could be used to develop interest in learning and increase skills of learners if it is designed according to student's interests and needs.

A significant difference was found in using "question and answer" as a method of teaching in formal educational settings for youth when grouped by experience in teaching. Significant differences were found in using "projects" and "supervised study" as methods of teaching in formal educational settings for adults when grouped by experience in teaching. Significant differences were found in using "conferences" and "video cassettes" as methods of teaching in informal educational settings for youth when grouped by experience in teaching. Significant differences were found in using "projects," "supervised study," "panel discussions," and "video cassettes" as methods of teaching in informal educational settings for adults when grouped by experience in

teaching. These findings suggest that these methods of teaching could be used to clarify the subject matter, encourage students to participate in learning, identify students are of interest, develop group interaction, increase understanding of the subject matter, and interpret information in different ways.

Significant differences were found in using "field trips" as a method of teaching in formal and informal educational settings for adults when grouped by the area of the state in which the respondent taught. There were no other significant differences suggesting that the cultures are the same throughout the state of Iowa, similar materials are available to all teachers throughout, environmental conditions are the same, participants in the learning process have the same basic conditions and the school systems are very similar.

Recommendations

The following recommendations can be drawn according to the findings of this research, the review of the literature, and the investigator's opinion related to findings in this study.

1. Teachers should
   - design the subject matter according to students' interests;
   - encourage students to participate;
   - use methods of teaching to influence students; and
   - develop subject matter useful for students.
2. Teachers should
   - believe in their teaching;
   - be interested in teaching;
   - realize student's attention; and
   - help to solve student's problems.
3. In using effective instructional methods, teachers need to use

- laboratory, demonstrations, projects, problem solving, field trips, and discussions in formal education for youth;
- discussions, demonstrations, laboratory, panel discussions, field trips, and problem solving in formal education for adults;
- demonstrations, laboratory, discussions, field trips, projects, and problem solving in informal education for youth; and
- demonstrations, discussions, field trips, and laboratory in informal education for adults.

4. Agriculture teachers should use the most important instructional techniques to encourage students to participate in the subject matter.
5. Agriculture teachers should use the most important instructional characteristics to influence students to increase their knowledge of the subject matter.
6. Agriculture teachers should use effective instructional methods according to the subject matter, type of learners, and the environmental conditions.
7. Additional research needs to be conducted to determine the effectiveness of using methods of teaching in formal and informal educational settings for youth and adults at the secondary level.

CHAPTER VI. SUMMARY

The purpose of this study was to develop a basic understanding of the importance of selected instructional techniques, the degree to which teachers should possess selected teacher's characteristics, the effectiveness of selecting instructional methods in formal educational settings for youth and adults, and the effectiveness of selected instructional methods in informal educational settings for youth and adults.

The population studied consisted of teachers of high school agriculture in the state of Iowa. The population of the study was 248 teachers from which the sample was obtained. A modified stratified random sampling technique was developed to obtain the desired informaion from the respondents.

Data were collected with a survey instrument designed by the researchers. Data collection began during early January, 1991. Two mailings were made resulting in 71 responses and a response rate of 78.89 percent.

Respondents were asked to indicate their perceptions about selected teaching techniques, teacher characteristics, and formal and informal teaching methods using a 1 (not important or not effective) to 5 (very important or very effective) scale to indicate their perceptions. Means, standard deviations, t-tests and analysis of variance were used to analyze the respondents' responses.

It was observed that teachers should involve students in the subject matter, make the subject matter useful, involve students by using different methods of teaching, require that students participate in learning activities, and use different methods of teaching to influence students. These teaching techniques had high mean scores.

Twenty-four statements were developed in order to assess the respondents' perceptions about selected teacher's characteristics. Those statements which had a high

mean value were: require students to participate in learning activities, help students develop their knowledge about the subject matter, believe in their teaching, and be interested in teaching.

In the third part of the questionnaire, there were four sections and each section listed eighteen different teaching methods. The four sections were:

- methods of teaching used in formal education for youth,
- methods of teaching used in formal education for adults,
- methods of teaching used in informal education for youth, and
- methods of teaching used in informal education for adults.

The highest mean value observed teaching methods used in formal education for youth was "laboratory exercises." The lowest mean was observed for "record and audio cassettes."

The highest mean value observed for teaching methods used in formal education for adults was "discussion." The lowest mean value was observed for "recitation."

The highest mean value observed for teaching methods used in informal education for youth was "demonstration." The lowest mean value was observed for "recitation."

The highest mean value observed for teaching used in informal education for adults was "demonstration." The lowest mean value was observed for "examinations."

In the level of teacher's education, it was indicated that recitation was a method which can be used in formal and informal education for adults.

In the level of teacher's years as a teacher, it was indicated that supervised study was a method which can be used in formal and informal education for adults.

In the level of teacher's age, the following points were made:

- question and answer can be used as a teaching method in formal education for youth;
- projects and supervised study can be used as teaching methods in formal educational settings for adults;

In the last section, methods of agricultural teaching used in formal and informal educational settings for both youth and adults, according to teachers who teach in different areas of the state of Iowa, the following observations were made.

- Examinations can be used as a method of teaching in formal education for youth.
- Field trips can be used as a method of teaching in formal and informal education for adults.

These following recommendations were developed by the investigators based on the findings of this research, the review of literature, and personal opinion.

1. Agriculture teachers should use different teaching techniques to involve students in understanding the subject matter.
2. Agriculture teachers should use an effective instructional teaching method to motivate students in transferring knowledge.
3. Agriculture teachers should be involved in teaching adults in formal and informal educational settings.

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APPENDIX A.

SURVEY INSTRUMENT

December, 1991

Dear Agricultural Education Teacher:

In agricultural education throughout the world, method of teaching is most important. Effective agricultural teaching methods are becoming a critical issue.

This study is designed to determine the perceptions of agriculture teachers who are responsible for conducting, choosing, implementing, and transferring agricultural learning activities to learners in formal and informal educational settings for both youth and adults.

One of the most important steps of this study is to analyze the perceptions of agriculture teachers about effective agricultural teaching methods used in the state of Iowa. We have selected you to express your opinion as an Iowa agriculture teacher. The information you provide is voluntary and will be treated with strict confidence. We need your help by answering the questions in this questionnaire. The questionnaire will not take more than half an hour to complete.

Your name and the information you provide us will be kept in strict confidence. Data collected will be used for a dissertation and that data will be analyzed by groups and no individuals will be identified. There are four parts to the questionnaire. Would you kindly respond to the items in each part and return it to us promptly?

We appreciate your cooperation in this study.

Sincerely,

Abdul Karim
Graduate Student
Agricultural Education
Iowa State University
Ames, Iowa 50011

Dr. Alan Kahler
Professor
Agricultural Education
Iowa State University
Ames, Iowa 50011

Code No. _____

Survey to Identify Effective Agricultural Teaching Methods in the State of Iowa

Mailing Questionnaire

Part I. Teaching techniques
Directions: Please indicate your response by using the following rating scale. Write the number that most accurately expresses your feelings toward that statement on the line preceeding the statement.

5 - very important	(V)
4 - important	(I)
3 - somewhat important	(S)
2 - of little importance	(L)
1 - of no importance	(N)

How important is each of the following in teaching?

_____ 1. Involve students in subject matter.

_____ 2. Make students participate in learning activities.

_____ 3. Share equally with learners.

_____ 4. Mix students in learning activities.

_____ 5. Makeg students react to visitors.

_____ 6. Work with students as a friend.

_____ 7. Make decisions democratically.

_____ 8. Make the place of learning more comfortable.

_____ 9. Improve environmental learning conditions.

_____ 10. Attend out-of-class school activities.

_____ 11. Make the learning activities satisfying to learners.

_____ 12. Organize lesson plans.

_____ 13. Use an objective in each lesson plan.

_____ 14. Share with students the objectives of the lesson.

_____ 15. Influence students by using different methods of teaching.

_____ 16. Make the subject matter useful.

_____ 17. Enhance students' performance in subject matter by using different methods of teaching.

_____ 18. Adapt method of teaching to the subject matter being taught.

_____ 19. Use tests to gain feedback from students on their learning activities.

_____ 20. Adapt teaching goals to learners' needs and interests.

_____ 21. Develop a method of student feedback about their learning activities.

_____ 22. Use many different methods to enhance students' performance

_____ 23. Use different methods of teaching based on students' needs and interests.

_____ 29. Use teaching strategies carefully to improve learning.

_____ 30. Using information in your teaching that will improve learners' life experiences.

Part II. Teacher's characteristics

Directions: Please indicate your response by using the following rating scale and write the number that most accurately reflects your feeling about the statement on the line preceeding the statement.

5 - very much	(V)
4 - much	(M)
3 - some	(S)
2 - little	(L)
1 - none	(N)

To which degree do you?

_____ 1. Have an interest in teaching?

_____ 2. Believe in your teaching?

_____ 3. Like to work in a group?

_____ 4. Like to have students share in learning activities?

_____ 5. Like students to participate in learning activities?

_____ 6. Like to help students to develop their knowledge about the subject matter?

_____ 7. Accept information from students?

_____ 8. Accept suggestions from students?

_____ 9. Like students to talk about their life problems?

_____ 10. Talk with your learners about their problems out of work?

_____ 11. Help students if they get into trouble?

_____ 12. Know your students' feelings?

_____ 13. Give students suggestions about their problems?

_____ 14. Give students guidelines about their problems?

_____ 15. Help students to find information?

_____ 16. Get attention from your learners?

_____ 17. Like students to call you by your first name?

_____ 18. Like to visit students in their home?

_____ 19. Meet students' parents?

_____ 20. Know students' performance?

_____ 21. Give students a high grade in their test?

_____ 23. Like to know your learners' interests?

_____ 24. Like to know your learners' needs?

_____ 25. Have time to help students in their interest areas?

Part III. Methods of teaching

Directions: Please indicate your response by using the following rating scale. Write the number that most accurately describes your feeling for the item on the lines provided.

5 - very effective	(V)
4 - effective	(E)
3 - somewhat effective	(S)
2 - of little effectiveness	(L)
1 - of no effectiveness	(N)

How effective is each of the following instructional methods in your teaching of youth and adults in a formal and informal educational setting?

	Formal		**Informal**	
	Youth	Adults	Youth	Adults
1. Lecture	_____	_____	_____	_____
2. Recitation	_____	_____	_____	_____
3. Laboratory	_____	_____	_____	_____

	Formal		Informal	
	Youth	Adults	Youth	Adults
4. Question and answer	_____	_____	_____	_____
5. Demonstrations	_____	_____	_____	_____
6. Supervised study	_____	_____	_____	_____
7. Field trips	_____	_____	_____	_____
8. Practicum	_____	_____	_____	_____
9. Survey	_____	_____	_____	_____
10. Examinations	_____	_____	_____	_____
11. Projects	_____	_____	_____	_____
12. Discussions	_____	_____	_____	_____
13. Panel discussions	_____	_____	_____	_____
14. Conferences	_____	_____	_____	_____
15. Illustrations	_____	_____	_____	_____
16. Problem-solving	_____	_____	_____	_____
17. Video cassettes	_____	_____	_____	_____
18. Recorder or audio cassettes	_____	_____	_____	_____

Part IV. Biographical information.
Directions: Please circle the letter next to the response which best describes your situation. Circle only one response.

1. Your gender is: A. Male B. Female
2. Your age is (in years) _____ years
3. The portion of time you are involved in teaching is _____ %
4. How many years of formal education have you completed? _____ years
5. How long have you been working as an agricultural educator? _____

THANK YOU FOR YOUR COOPERATION.

APPENDIX B.

CORRESPONDENCE

Iowa State University of Science and Technology Ames, Iowa 50011-1050

Department of Agricultural Education and Studies
201 Curtiss Hall
Telephones:
Administration and Graduate Programs 515-294-5904
Research and Extension Programs 515-294-5872
Undergraduate Programs 515-294-6924

January,1992

Dear Agricultural Education Teacher.

On the 10th of December, we sent to you a questionnaire seeking your opinion on the importance of selected methods in teaching agriculture to youth and adults. At this point in time we have not recieved yuor completed questionnaire. Consider this letter as a friendly reminder about the questionnaire and an encouragement for you to take a few minutes and complete the questionnaire and return it to us. Your response is vital to the success of our research on methods used by agriculture teachers in their instructional programs.

If you have already completed and sent your questionnaire,accept our sincere thanks for helping us.

May we hear from you soon.

Sincerely,

Abdulkarim
Graduate Student
Agricultural Education
Iowa State University
Ames,Iowa 50011

Dr.Alan Kahler
Professor
Agricultural Education
Iowa State University
Ames,Iowa 50011

February 1992

On the 10th of January, 1992, we sent to you a second letter as a friendly reminder to return a questionnaire seeking your help by giving us your opinion on the importance of selected methods in teaching agriculture to youth and adults. Since we have not heard from you, we are sending you the questionnaire again in hopes that you will take a few minutes to complete it and return it to us. Your response is an important factor in the success of our research on methods used by agricultural teachers in their instructional programs.

If you have already completed and returned your questionnaire, please accept our sincere thanks for helping us. If not, may we hear from you soon?

Sincerely,

Abdul Karim
Graduate Student
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